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Agricultural Policy Reform

Issues and Implications for Africa

Stacey Rosen, Editor

Abstract

This report examines the pattern of government intervention in the agricultural markets of nine African nations during 1982-89. Producer and consumer subsidy equivalents are calculated to measure the level of transfers to and from producers and consumers that resulted from various government policies. A chapter on each nation—Egypt, Kenya, Morocco, Nigeria, Senegal, South Africa, Tanzania, Zambia, and Zimbabwe—provides background on the economy and agricultural sector of the country; a review of the macroeconomic, trade, and agricultural policies; and estimated producer and consumer subsidy equivalents for selected commodities. Since these countries had experienced low agricultural output, limited import capacity due to rising foreign debt, and stagnating economic growth, structural adjustment reforms were begun in the 1980's. The report traces the early response to the agricultural reforms, especially in the exchange rates and the marketing systems.

Keywords: Africa, agricultural policy, structural adjustment, market liberalization, subsidy equivalents, Egypt, Kenya, Morocco, Nigeria, Senegal, South Africa, Tanzania, Zambia, Zimbabwe

Acknowledgments

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Summary

Taxes on farmers and food subsidies for consumers fell as the governments of nine African nations reformed their agricultural policies in the 1980's. This report traces effects of former government policies and subsequent reforms during 1982-89. Countries studied were Egypt, Morocco, Kenya, Tanzania, Zambia, Senegal, Nigeria, Zimbabwe, and South Africa.

Governments of these nations intervened significantly in agriculture during the 1970's and early 1980's, with heavily taxed farmers and widespread urban food subsidies. Governments also set prices and manipulated exchange rates which had the net effect of transferring income from producers to consumers. Such policies depressed farm production, leading to more food imports and higher foreign debt. Reforms began in the 1980's.

The new report measures government policy effects by estimating producer and consumer subsidy equivalents (PSE's and CSE's). PSE's are the ratios between the total value of policy transfers to producers and total producer revenue. A negative PSE signifies that government policies reduced producer revenue. CSE's are similar indicators on the consumer side. This study measures PSE's and CSE's for selected commodities for the nine African nations.

These nine governments intervened in all stages of agricultural production and consumption. Marketing boards, often poorly managed, set production quotas and prices, and at times, imposed obligatory sales to government agencies. Artificially set food and producer prices distorted domestic trade, and unrealistic exchange rates deteriorated the balance of payments. At the same time, imports of raw materials and capital goods, essential for economic growth, were crowded out by the need to import food for the growing populations. Since agriculture contributes more than 30 percent of gross domestic product in Africa, the poor performance of this sector damaged these nations' overall economies.

International response brought policy reform. The World Bank and the International Monetary Fund insisted in the early 1980's on reforms in the agricultural policies of the affected countries. The goals of the reforms include limiting government borrowing and expenditures, reducing government deficits relative to the gross domestic product, reforming exchange rate policies, liberalizing markets, and decontrolling prices.

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Introduction

Agriculture contributes more than 30 percent of gross domestic product (GDP), on average, in Africa. The performance of the agricultural sector is consequently a primary determinant of the performance of the overall economy. But, African agriculture has performed poorly for more than two decades. In many countries in the region, food production failed to keep pace with rapid population growth. The declining productivity stemmed from weak marketing infrastructures, limited use of improved technology, inadequate research and extension, and limited credit availability.

These countries have encountered financial imbalances stemming from a series of external shocks that began in the mid-1970's, including rising oil prices, increasing and variable interest rates, and a heavy debt burden. As a result of these financial constraints, imports have been limited. Food imports, however, have become a priority because of the precarious situation of food security in these countries. Imports of raw materials and capital goods, which are essential for economic growth, have consequently been crowded out.

Most African countries implemented structural adjustment programs in the 1980's in order to address these issues of declining agricultural output, limited commercial import capacity, and stagnating economic growth. The reforms were proposed and supported by international financial institutions and foreign donors. The principal policy adjustment areas in agriculture have been exchange rates and the marketing system (10).

How Governments Intervene in Agriculture

Given the importance of agriculture in employment, income, and export earnings, policy intervention in the sector has been widespread. Governments have intervened in all stages of production, consumption, and trade of output as well as inputs. Implemented policies have been aimed at a single commodity, the entire sector, and the overall economy.

Commodity-Specific Policies

The dominant form of government intervention in African agriculture has been the marketing board. Marketing board responsibilities have included buying, storing, and selling crops at government-set prices. These boards were expected to be more efficient than the private sector. However, many marketing boards experienced financial losses by maintaining incentive prices to producers while keeping consumer prices low. In addition, the boards were characterized by overstaffing, inadequate budgets, and poor management (10).

Pricing policies have been another widely used commodity-specific intervention. Governments have set prices for many crops to provide incentives to farmers and assure some degree of price stability. In practice, however, real producer prices have not been maintained and have often declined in order to keep retail prices low to protect the urban consumer. If an economy is not adequately stimulated as a result of reform, eliminating or reducing these consumer subsidies could reduce consumers' purchasing power which, in turn, could hurt nutrition.

Other policies which affect producers are border policies (tariffs or quotas), which have been used to maintain prices at specified levels or within a specified range and to conserve foreign exchange.

Sector-Specific Policies

Governments can implement many policies that affect the agricultural sector, including credit, input, or transportation policies. Many governments offer preferential interest rates for the agricultural sector. To stimulate the use of improved inputs and to increase yields, governments subsidize fertilizer and irrigation. Governments provide transportation subsidies to increase marketed output.

Economywide Policies

A government can intervene in the agricultural sector by implementing general economic policies which, while not directly aimed at agriculture, may have indirect effects.

A government's monetary policy will influence inflation, interest rates, and exchange rates, which, in turn, will affect the performance of the agricultural sector. For example, expansionary monetary policies through the 1970's and early 1980's led to higher inflation in most African countries. During this time, exchange rates were not adequately adjusted, and the currency became overvalued. As a result, imports became cheap relative to exports. Because of financial constraints and the policy of protecting domestic industry, many governments restricted imports through quotas, exchange controls, and licensing. Food imports, however, have traditionally been excluded from these controls to protect urban consumers. This policy effectively subsidizes food imports,

thus providing a possible disincentive to domestic producers. By reducing the competitiveness of exportables, an overvalued currency discourages producers of export crops.

A restrictive monetary policy, in which producers may have less access to foreign exchange or credit, can also hinder output.

Fiscal policies stemming from budget deficits, such as reductions in real government wages or employment, could have a variety of effects on the agricultural sector. Such effects include reduced demand for purchased food, reduced flow of remittances to rural areas, and a slowdown in rural-urban migration that increases the agricultural labor force. Reduced expenditures on services for the agricultural sector could imply increased production costs. Reduced public investment in the agricultural or transport sectors could restrict the growth of rural profits.

Policy Reform

The World Bank and International Monetary Fund (IMF) proposed reform programs that recognized the problems resulting from the policies listed above. In 1980, the World Bank introduced structural adjustment programs that focused on reforming macroeconomic and agricultural pricing policies. Financing became contingent upon implementation of these reforms. In 1986, the IMF introduced a Structural Adjustment Facility that requires governments, with the assistance of the IMF and the World Bank, to design a 3-year policy framework paper to outline policy objectives, policy instruments, targets, and financing requirements. These IMF programs had several goals, including (1) limiting government borrowing and expenditures, (2) reducing government deficits relative to GDP, (3) reforming exchange rate policies, (4) liberalizing markets, and (5) decontrolling prices.

Many African countries are reforming their pricing, marketing, and trade policies. Pricing reforms aim to stabilize prices while reducing the distortion caused by fixed pricing. The ultimate objective of price reform is to bring domestic prices closer to those at world levels. Measures taken to achieve this goal include abolishing or limiting pricing regulations, currency devaluation, and removal of input subsidies. Liberalization of the marketing system involves breaking up state marketing monopolies, encouraging private sector activity, and relaxing restrictions on the internal movement of grain (2, 10).

African trade policy reform is centered on export promotion and import liberalization. Export promotion includes exchange rate reforms, reduction of export duties or taxes, reduction of export quotas or regulations, introduction of export subsidies, allowance for duty-free imports for exporters, and the establishment of export-processing zones. Import liberalization includes removal of quotas or licensing restrictions and changes in the tariff structure (1).

Devaluation improves international competitiveness and increases incentives to produce goods for export. It also works to reduce import demand and so reduces the current account deficit.

How Is Government Intervention Measured?

For the purposes of this report, the value of transfers from government policies to producers and consumers has been estimated using producer and consumer subsidy equivalents (PSE's and CSE's). A PSE is the ratio between the total value of policy transfers to producers and total producer revenue. A CSE is the ratio between total value of policy transfers to consumers and total consumer expenditure for the commodity. PSE's comprise both the budgetary effects and the wedges driven between domestic and international prices that ensue from various government policies. CSE's are generally derived from the wedge policies driven between domestic and international prices. The subsidy equivalents measure the net effect of several policies, including fertilizer subsidies and exchange rate manipulation (5, 6).

PSE's and CSE's illustrate the relative importance of various government policies on producer revenues and consumer costs. These policies reflect the changing level of government intervention in the sector.

Subsidy equivalents can be expressed in several different ways. In this report, we refer to a total subsidy equivalent measured in local currency, which represents, to producers or consumers, the value of all policies. However, to enable cross-country or cross-commodity comparisons, we calculate a percentage PSE (or CSE) by dividing the total policy transfer by producer revenue (or consumer cost). The percentage PSE was calculated as follows:

$$\frac{Total\ transfers}{Value\ to\ producers} = \frac{Q \times (P_d - P_w \times X) + I}{Q \times P_d},$$

where Q is quantity produced, P_d is producer price (in local currency), P_w is world price (in U.S. dollars), X is the exchange rate, and I is indirect transfers through policies like input subsidies or exchange rate distortions. The CSE's were calculated using the same methodology. A positive PSE (or CSE) indicates a policy transfer or subsidy to the producer (or consumer). Conversely, a negative PSE (or CSE) indicates a tax (5, 6).

The principal difficulty in measuring these subsidy equivalents was the lack of data, particularly for prices and marketing costs. In several cases, commodities did not have comparable world reference prices. For example, because of quality differences, reference prices for coffee were replaced by export unit values for Kenya and Tanzania.

In this report, PSE's and CSE's are measured for selected commodities for nine African countries: Egypt, Kenya, Morocco, Nigeria, Senegal, South Africa, Tanzania, Zambia, and Zimbabwe for the years 1982-89. Comparisons of results among countries can be misleading because policy coverage may not be the same, and products and commodities differ widely among countries.

Summary of Government Intervention in African Agriculture

As mentioned earlier, many African countries began implementing reform programs in the early 1980's. The principal goal of these programs was to reduce government intervention through market liberalization and to increase reliance on market forces to determine prices and exchange rates. The PSE's and CSE's calculated for these nine countries appear to confirm the implementation of this reform effort.

Producers

Producers, on average, were taxed in the early 1980's (table 1). In Egypt, Nigeria, and Tanzania, these taxes were quite heavy, often more than two times producer revenue. In more recent years, intervention lessened, taxes fell, and in some cases, producers who had been taxed earlier now receive subsidies (fig. 1). For example, Nigeria's sugar and cotton producers were taxed at rates of more than 100 percent of their revenue until 1985. Between 1987 and 1989, these farmers received subsidies ranging from 27 to 80 percent of their revenue.

Table 1--Producer subsidy equivalents

Country and commodity	1982	1983	1984	1985	1986	1987	1988	1989
				Percent				
Egypt:								
Wheat	-869	-498	-303	-180	-130	-95	-82	-22
Corn	20	17	18	17	16	15	13	11
Rice	-1,949	-1,242	-870	-469	-369	-429	-119	-79
Sugar	-521	-349	-233	-228	-213	-413	-185	-170
Cotton	-356	-322	-362	-414	-363	-285	-470	-745
Kenya:								
Wheat	-17	6	36	41	52	54	23	41
Corn	-76	-45	6	27	46	35	-0	6
Rice	-75	16	50	68	61	39	-18	-25
Sugar	-126	18	8	58	53	36	31	-4
Coffee	-24	23	-8	-3	-23	-7	-48	2
Tea	-32	-8	19	23	13	7	-24	-25
Morocco:								
Wheat	3	-8	6	13	5	-1	-7	-7
Corn	4	-1	12	16	16	8	-20	-15
Barley	0	-11	-4	9	5	-2	-23	-18
Cotton	44	7	46	59	67	34	49	35
Sugar	-66	-147	31	90	-24	-86	-192	-175
Nigeria:								
Wheat	-13	-36	-45	-28	42	65	74	61
Corn, white	2	2	2	2	3	8	4	3
Rice, milled	139	60	80	98	116	36	38	-8
Sugar	-138	-167	-289	-241	-137	40	27	31
Cotton	-136	-99	-210	-171	-90	65	49	80
Cocoa	-138	-211	-472	-422	-106	9	-18	-18
Senegal:								
Millet/sorghum	31	6	4	35	66	73	65	53
Rice	45	33	35	86	121	126	96	91
Peanut oil	2	-195	-148	-35	63	55	4	-35
South Africa:								
Wheat	20	20	12	-18	3	24	-21	-22
Corn	10	5	23	2	32	43	-8	2
Sugar	-74	38	12	24	49	35	10	-50
Tanzania:								
Wheat	-186	-113	-20	46	46	-9	-99	-79
Corn	-244	-190	-12	53	70	8	-73	-53
Rice	-263	-112	31	103	119	55	-16	-25
Cotton lint	-313	-240	-115	91	72	-112	-77	-29
Coffee	-812	-497	-336	-209	-223	-207	-186	-112
Zambia:								
Wheat	63	18	37	15	10	8	27	-15
Corn	3	-58	-59	-96	-119	-112	-100	-103
Zimbabwe:								
Wheat	-27	-38	-24	7	-6	20	1	3
Corn	-39	-154	-98	-2	26	-9	13	17
Sorghum	-64	-130	-78	-16	7	14	-5	-19
Cotton lint	-54	-86	-85	-20	8	-27	-42	-26

In most cases, African producers have a comparative advantage in the production of cash crops as opposed to food crops. However, governments encouraged the planting of food crops over cash crops to reduce reliance on imports and to reach self-sufficiency. Africa's food crop producers consequently received more support than did cash crop producers. Cash crop producers were often taxed. In Kenya, wheat and corn producers usually received subsidies averaging about one-third of producer revenue. On the other hand, coffee producers were taxed in 6 of the 8 years studied at an average 20 percent of their revenue. In Senegal, rice, millet, and sorghum producers received significant subsidies throughout the study period, while peanut producers were often taxed.

Price setting and exchange rate manipulation were the principal policy tools with which governments intervened on the producer side (table 2). These policies, however, countered each other. Exchange rate distortions had the largest effect in the early years of the study. Overvalued currencies resulted in taxes to producers. In recent years, when exchange rates were set closer to equilibrium levels, taxes lessened considerably. Government pricing policies have provided subsidies to producers in most years because producer prices have been set or maintained above world levels. For the most part, fertilizer and credit subsidies have been negligible, averaging less than 10 percent of producer revenue.

Figure 1

PSE's for selected countries, 1982-89

Policy reform reduced tax burden on producers.

Percent

Kenya Senegal Nigeria Zimbabwe
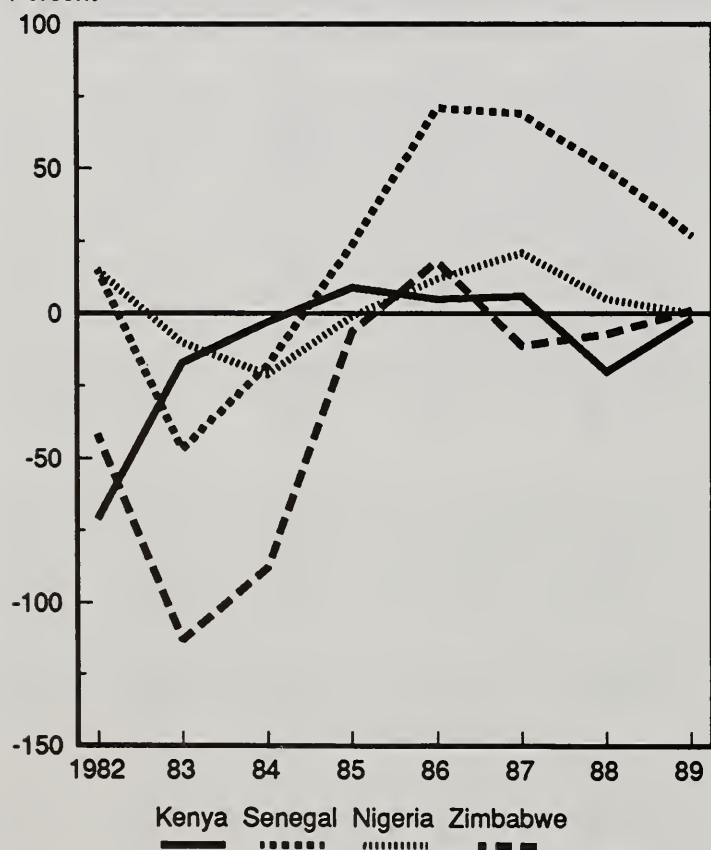
Consumers

In the early 1980's, government policies toward consumers were characterized by heavy intervention and large subsidies (table 3). In 1982-84, subsidies to consumers of corn, the staple crop in Kenya, Zambia, and Zimbabwe, ranged from 32 to 113 percent of the value of the crop. Over the years, as government budget constraints grew, the level of intervention as well as support fell (fig. 2). These subsidies to the corn consumers fell considerably or became taxes in some years. Even in Egypt, where consumer subsidies had historically been a mainstay of agricultural policy, subsidies fell considerably in more recent years. Such a trend reflects the realization that consumer subsidies depress local agricultural production, divert resources from industrial investment, and stimulate imports. A distinct exception to this pattern of lower consumer subsidies occurred in Zambia. Subsidies to Zambian corn consumers increased through 1988. The Government repeatedly proposed increases in corn meal prices, but urban consumers responded in protest. As a result, the price rises were rescinded.

The same policies that influence the level of support for producers affect consumers: pricing and exchange rate. The prices for consumers have been held below world prices, thus providing a subsidy. As was the case with producer pricing policies, such subsidies became too expensive to maintain. However, urban consumers are very powerful politically. Consumers in many countries have come to expect low prices for staples, and in some cases, such as Morocco and Zambia, consumer riots have taken place when the governments have announced price increases. Nevertheless, many governments have been forced to remove subsidies because of budgetary considerations. Overvalued exchange rates also worked as a subsidy to consumers. However, as governments have moved their official exchange rates closer to equilibrium rates, this subsidy has fallen.

Conclusions

It is difficult to assess the effect of these reforms on the agricultural sectors of the nine studied countries for several reasons, including (1) the short time the policies have been in place, (2) external and exogenous shocks that have offset the possible positive effect of policy change, (3) structural rigidities within each country that influence the outcome, and (4) our lack of knowledge as to how the agricultural sectors of these countries would have performed without the adjustment programs.

Drought is probably the most important shock in Africa. These countries greatly depend on agricultural output for overall economic performance. This dependence makes them especially vulnerable to changes in weather. There-fore, when a drought occurs, either domestic food needs cannot be met and scarce foreign exchange must be spent on imports, or the output of export crops falls and export earnings go down. All these things can also take place at the same time.

External shocks include changing world prices that can significantly influence a country's position on balance of pay-

ments and, consequently, fiscal performance. Prices of primary commodities, Africa's principal export, have not rebounded since the decline of the early 1980's. This lowered return has exacerbated foreign exchange constraints and has limited imports of essential inputs.

The linkage between policy changes and supply response may be weak because of the subsistence nature of these economies, particularly the agricultural sector. Many small-scale farmers are located in remote areas and face high transportation costs and little access to markets. As a result, this group is relatively unaffected by price changes or exchange rate policies. Commercial farmers, in general, are expected to gain the most from policy reforms. Also, institutional or infrastructural constraints must be considered. For example, even if restrictions on the internal movement of grain are removed, grain may not begin to move quickly from surplus areas to deficit areas because of limitations in the road and rail systems. Or,

Table 2--Producer subsidy equivalents by policy component

Policy and country	1982	1983	1984	1985	1986	1987	1988	1989
				Percent				
Price wedge:								
Egypt	-53.5	-40.7	-52.5	-61.4	-84.7	-119.0	-116.6	-193.4
Kenya	-12.4	7.1	4.0	3.1	15.5	23.3	-5.8	-4.3
Morocco	6.8	3.8	2.8	5.6	13.3	12.0	8.9	7.9
Nigeria	1.6	.8	-1.1	-1.5	5.6	0	0	0
Senegal	15.1	-42.3	-12.0	22.9	70.0	68.8	51.5	28.1
South Africa	15.3	8.0	9.2	.6	23.9	33.8	-11.9	-4.3
Tanzania	63.8	63.8	85.8	103.9	99.4	57.8	-15.8	-46.4
Zambia	5.2	-54.9	-75.2	-87.3	-133.5	-118.3	-98.1	-98.3
Zimbabwe	9.8	-50.4	-59.2	-3.3	23.8	2.3	7.6	2.2
Exchange rate:								
Egypt	-449.0	-291.9	-225.0	-185.6	-142.6	-91.2	-55.2	0
Kenya	-38.5	-11.2	4.6	16.5	.6	-7.4	-11.0	0
Morocco	-9.7	-16.4	-7.8	3.2	-8.1	-12.7	-21.7	-18.3
Nigeria	-31.9	-41.6	-57.9	-48.4	-40.8	4.2	-10.1	-10.1
Senegal	-1.5	-9.1	-6.3	1.1	.6	.2	-1.2	-1.4
South Africa	-13.7	-12.5	-6.0	-11.4	-12.9	-13.2	-6.0	-4.6
Tanzania	-395.4	-280.8	-130.6	-59.1	-43.9	-71.2	-60.1	-8.9
Zambia	-3.0	2.6	18.2	-9.9	12.4	-7.2	-2.0	-6.1
Zimbabwe	-51.6	-63.1	-28.5	-2.5	-6.2	-13.5	-14.1	-1.3
Fertilizer:								
Egypt	5.7	5.9	5.8	4.9	4.6	4.8	4.3	3.6
Kenya	.6	1.0	.4	.4	.7	.9	2.7	2.4
Morocco	2.1	-.3	6.0	2.5	-.5	-2.4	-.8	-2.6
Nigeria	1.6	2.3	1.8	2.3	2.8	6.3	3.4	2.5
Senegal	1.8	3.9	0	.4	.4	.2	.1	0
South Africa	.3	.3	.1	.1	0	0	0	0
Tanzania	5.2	2.1	0	-1.2	-.9	.6	1.2	1.6
Zambia	2.2	-3.6	0	4.1	6.8	9.0	3.6	5.1
Credit:								
Egypt	.6	.5	.5	.6	.8	.7	.8	.8
Morocco	.5	.5	.3	.5	.6	.9	.6	.6
Nigeria	.3	.4	.3	.3	.2	.2	.2	.2
South Africa	3.5	6.3	7.0	4.4	4.1	3.3	3.5	3.5
Pesticide:								
Egypt	4.4	3.6	3.5	3.9	4.2	3.6	2.9	2.3
Nigeria	.2	.2	.2	.1	.2	.1	.1	.1
Transportation:								
Morocco	-.4	-.5	-.4	-.3	-.5	-.5	-.7	-.7
South Africa	0	.1	.3	.2	.1	0	.1	0
Import controls/bans:								
Nigeria	41.9	24.3	31.3	41.8	42.2	6.1	9.0	3.0
South Africa	-8.0	11.6	2.7	5.5	9.7	8.8	2.6	-6.8
Irrigation:								
Egypt	2.4	2.5	2.6	2.2	2.2	2.0	1.9	.6
Morocco	2.0	3.0	2.9	1.8	1.2	1.7	1.5	1.4
Seed:								
Egypt	10.1	9.3	9.8	8.3	8.3	8.2	6.9	5.8
Tariff:								
Nigeria	1.3	3.8	4.1	4.7	1.8	4.5	2.6	3.8

if fertilizer imports are liberalized, distribution may proceed slowly because of the lack of a domestic retail network.

All these factors add to the difficulty in assessing the success or failure of the reform programs. Therefore, we have not evaluated the producer and consumer response to the changes in government transfers. Instead, we have focused on donor response to the reform effort and on the expected policy prescriptions of the international institutions that initiated these programs.

The direct benefit of the reform programs was an increase in financial assistance as donors shifted support to countries with sustained adjustment programs. For example, official development assistance to Senegal and Tanzania increased 2-1/2 times between 1985 and 1990. In Kenya, assistance more than doubled.

The potential effect of African agricultural reforms on opportunities for U.S. agricultural commodities is unclear. U.S. agricultural exports to Africa averaged around $2 billion per year in the late 1980's. Grains accounted for 75 percent of these exports, principally wheat and corn.

As a result of these reforms, producers who had historically been taxed are currently taxed at a lower rate or are subsidized. This policy is expected to stimulate production, which in turn could reduce demand for imports, thus hurting U.S. export opportunities. Consumer subsidies have declined on average. Prices and, subsequently, consumer costs will increase, which may hurt the nutritional status of the populations, particularly the low-income groups, in the short term. This deprivation may increase the need for food aid. In the late 1980's, U.S. food aid shipments to Africa ranged between 3 and 4 million tons annually, about half of all U.S.

Table 3--Consumer subsidy equivalents

Country and commodity	1982	1983	1984	1985	1986	1987	1988	1989
				Percent				
Egypt:								
Wheat	534	419	297	304	262	239	320	76
Corn	724	456	435	362	227	11	36	-9
Rice	1,677	1,042	774	578	572	294	139	111
Kenya:								
Wheat	33	36	15	-5	-15	-18	15	-1
Corn	58	71	35	6	-3	-4	24	18
Rice	16	8	-27	-41	-39	-29	-26	-24
Morocco:								
Sugar	-45	-44	-57	-66	-54	-48	-24	-10
Wheat flour	86	82	148	92	66	46	14	119
Vegetable oil	40	46	66	53	40	33	36	50
Nigeria:								
Wheat	143	184	321	267	146	-134	-277	-161
Corn	0	0	0	0	0	0	0	0
Rice, milled	-21	-10	-31	-51	-41	-7	-6	6
Sugar	144	175	302	247	145	-36	-25	-34
Cotton	121	162	299	252	139	-67	-33	-39
Senegal:								
Wheat	-16	-10	6	-11	-28	-22	6	9
Millet/sorghum	-45	-28	-28	-47	-66	-71	-66	-58
Rice	-27	-28	-27	-50	-69	-71	-45	-34
Peanut oil	-34	8	9	-19	-69	-64	-25	-2
South Africa:								
Wheat	17	16	35	51	24	-7	23	38
Corn	-1	24	11	11	-27	-33	10	-10
Sugar	24	-41	-17	-33	-23	-23	-31	-5
Tanzania:								
Wheat	123	45	-24	-48	-58	-41	-46	-55
Corn	120	80	29	-30	-52	3	20	28
Rice	175	84	-20	-44	-39	-19	-17	-29
Cotton	346	265	208	3	-16	60	9	-19
Zambia:								
Wheat	-34	-11	-17	-35	9	-58	-64	-70
Corn	32	89	77	89	306	487	440	159
Zimbabwe:								
Wheat	60	41	19	-4	11	-6	11	9
Corn	44	113	82	16	-5	17	2	-9
Sorghum	98	121	75	21	10	1	11	1
Cotton	93	110	88	40	22	71	106	81

Figure 2

CSE's for selected countries, 1982-89

Policy reform reduced subsidies to consumers.

Percent

Kenya Tanzania Nigeria Zimbabwe

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food aid shipments. On average, food aid accounts for 15 to 20 percent of Africa's total cereal imports.

The increases in production should result in increased revenues for producers in the medium and long terms. Depending upon the importance of the agricultural sector in the economy, such increased incomes may spur overall economic growth, thereby stimulating consumption and potentially increasing import demand for U.S. commodities.

According to the World Bank, Sub-Saharan Africa is the only region where deterioration of living standards accelerated during the 1980's. The forecast for the end of the century indicates that poverty will decline worldwide with the exception of Sub-Saharan Africa. This region will have 30 percent of the developing countries' poor by 2000 as compared with 16 percent in 1985. A majority of the poor live in rural areas. Thus, government and donor emphasis should be on improvements in agricultural productivity, creation of employment, and provision of basic social needs in the rural areas.

7

Egypt

By Mark Wenner, George Gardner, and Stacey Rosen

Economic and Agricultural Developments

Egypt is located at the crossroads of the Middle East, Africa, and the eastern Mediterranean. Its chief natural resource is the Nile River. The cardinal environmental features are the limited land base and the high population density. Only 4 percent of Egypt is habitable: those parts that comprise the area alongside the Nile River and around the Nile delta. This reduced area sustains a population of more than 50 million. Despite expensive land reclamation projects, arable land area has not increased because of accelerating urbanization and desertification. Since 1960, total cropland has remained relatively constant at 6 million acres or 2.4 percent of total area. All arable land is irrigated, however, allowing intensive, year-round cultivation with the aid of chemical fertilizers. Salinization and waterlogging are two environmental problems that are emerging as a consequence of poor drainage and intensive water use.

The important foreign exchange earners, in order of importance, are worker remittances, energy, tourism, cotton, and textiles. Egypt cannot generate sufficient jobs for its population, so some 1.4 million (unofficial estimate is in the 2-4 million range) people work overseas, mostly in the oil fields of neighboring Arab states. Egypt has it own hydrocarbon resources: modest oil reserves and abundant natural gas deposits. Both resources are costly to extract but have generated 42 percent of Egypt's foreign exchange earnings from merchandise trade in recent years. Hydroelectric generation from the Aswan High Dam supplies 27 percent of the country's electricity need. However, recurrent droughts in the Ethiopian highlands reduce water flow in the Nile, which in turn reduces electricity output at Aswan.

Since the overthrow of constitutional monarchy in 1952, economic development policy can be divided into two distinct regimes. The era of economic planning and pervasive state control coincided with the tenure of the first president, Gamal Abdel-Nasser, who served from 1954 to 1970. During this time, the Government nationalized trade and heavy industries, administered prices, and established an extensive food subsidy system. After Nasser's death in 1970, Anwar Sadat rose to power. After a 2-year transition period, he initiated a period of gradual liberalization but still preserved a role for an activist government in 1973. He encouraged direct foreign investments, loosened price controls, and favored private farmers as opposed to cooperatives. Bloody riots in 1977, however, led to a slowing of price liberalization policies and to the maintenance of food subsidies (1).[1]

Each period had its successes and failures in economic performance. Notable achievements were the development of the energy sector, the provision of a cadre of highly educated professionals, extensive social programs, and a manufacturing base. During the planning or interventionist period, the economy grew at an average rate of 6 percent between 1960 and 1965 and then slowed to 3 percent between 1965 and 1973, a period of military mobilization and open warfare with Israel. During the early part of the"liberal-activist era,"1973-80, the Egyptian economy soared due to the boom in oil prices. The surge in real income per capita (8-9 percent per year) increased the demand for imported goods, particularly foodstuffs.

In the late 1980's, the economy soured when the drop in oil prices depressed foreign exchange earnings and remittances. This sharp decline in revenues made the accumulating ill effects of policy distortions more evident. Growth in gross domestic product (GDP) averaged 1.4 percent between 1986 and 1989, below the average population growth rate of 2.4 percent. Inflation averaged 30 percent, and unemployment increased to about 20 percent. Agricultural production barely equaled the population growth rate, and food import dependence increased to about 50 percent. Balance of payments pressures contributed to shortages of imported inputs and created the need for additional foreign borrowing. The external foreign debt amounted to $49 billion in 1988, exceeding GDP 1.45 times and exports 4 times (13). Arrearages topped $2.1 billion, and debt servicing obligations constituted 15 percent of total exports of goods and services (13). As economic performance and international creditworthiness deteriorated, economic reform and adjustment became necessary.

Policies in the 1980's

In 1987, Egyptian authorities concluded a standby arrangement with the International Monetary Fund (IMF) on more generous terms than had been granted to almost any other debtor country. Between 1987 and 1988, Egypt rescheduled $6.5 billion owed to Western developed countries (6). During that year, exchange rates were partially unified, producer prices were raised, and some public enterprises were reformed. However, more debt rescheduling was needed in summer 1988, and creditors felt that the 1987 IMF agreement was too lenient.

Protracted negotiations over the pace of adjustment policies began and continued into 1991. Meanwhile, donors suspended or lowered aid disbursements in the absence of an agreement with the IMF. Egyptian authorities favored grad-

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

ual adjustment, while the donors urged "shock treatment" for the economy. Finally, in May 1991, a new agreement for about US$380 million was reached, and a comprehensive program of accelerated reforms was undertaken (6). As a result of the new commitment to rapid reform, the international community provided substantial additional financial assistance. The Paris Club completely restructured Egypt's private commercial external debt, the U.S. and Gulf State creditors canceled $13 billion in debt, and a set of Western donors helped establish a special compensation fund to mitigate some of the social costs of structural adjustment and the reabsorption of displaced workers from Iraq and Kuwait (6).

Macroeconomic and Trade Policy Developments

The Egyptian economy in the 1980's has been marked by heavy but abating state control. The main interventions included an overvalued exchange rate, high trade barriers (bans, licensing requirements, and steep tariffs), a large number of public sector enterprises, and wide use of administered prices.

The Egyptian pound has been consistently overvalued since 1960, adversely affecting export competitiveness (1). A multiple-tiered system of exchange rates, designed to conserve foreign exchange by limiting luxury imports to favor imports of essential goods, contributed to this misalignment. Since the 1987 reforms, the tiers of the exchange rates have gone from seven to two, and a series of currency devaluations started in 1989 (6).

The Ministry of Supply and Home Trade has a monopoly on the import of wheat and corn, which indirectly affects domestic prices (11). Yellow corn, not white, is imported, and it is used exclusively as a feed grain. Because white corn is a substitute for wheat, its price is influenced by the volume of wheat imports. In an attempt to conserve foreign exchange in recent years, this Ministry has banned the import of high-valued agricultural products such as poultry and fruits (11). However, tariff rates have declined, and the list of products requiring import authorization by the Government has been reduced from 55 to 13 as of 1991 (6).

Agricultural Policy Developments

Egypt's principal crops are wheat, cotton, berseem clover, rice, sugar, potatoes, and citrus. The Egyptian Government has historically taxed exportables, especially cotton and rice (1). Egypt has a marked comparative advantage in cotton and dominates the world market for high-quality cotton, accounting for 60 percent and 30 percent of world trade in extra-long and long-staple varieties (9). In addition to being an important foreign exchange earner, cotton production supports the largest labor-intensive industrial activity, spinning and weaving. Textiles, in turn, accounted for 50 percent of all the public sector's manufactured exports for the 1984-88 period.

Egyptian agriculture is favored by a long growing season, fertile soils, and modest temperature fluctuations. The main constraints are on the availability of water for irrigation and of chemical inputs. All arable land is irrigated year round, in-

creasing the demand for fertilizer. Cropping patterns have been influenced by mandatory procurement regulations and do not necessarily reflect comparative advantage or profitability (1). Partial policy reforms in 1987 removed most of the crops from the quota system. Only rice, cotton, and sugarcane continue to be subject to mandatory acreage requirements.

Before 1988, the most remunerative sectors in agriculture were the unregulated ones: fodder, feed grains, fruits, vegetables, and livestock. Average net returns per hectare for feed grains and beans were higher than for wheat and rice (6). Since 1988, however, the Government has substantially raised the producer prices of wheat to stimulate local production and to improve self-sufficiency. Compared with other cereals and with pulses, clover, and cotton, wheat is now the most profitable major field crop (6). Because of this price stimulus, Egyptian farmers have set four consecutive wheat production records. Wheat is a staple in the Egyptian diet, accounting for 35 percent of all caloric intake. The surge in production has helped conserve foreign exchange (9).

Egyptian agricultural policy has two broad objectives. First, authorities seek to provide an adequate supply of food staples to all income groups in the population. Inexpensive and readily available food has become an entitlement right since the early Nasser years (2, 8, 12). Second, authorities seek self-sufficiency in strategic food crops. Other lesser objectives include increasing farm income, insulating producers from international price fluctuations, and conserving foreign exchange. The priority ranking of the various policy goals has changed over time with some inconsistencies and conflicts.

The consumer food subsidy system has had positive effects on nutrition, but has also affected budgets, inflation, balance of payments, production, and trade. (8). The system has served to reduce malnutrition to the lowest level for countries in the same per capita income range. However, the subsidy system also depresses local agricultural production, diverts resources from industrial investment, and stimulates imports that contradict the goal of self-sufficiency (8). The real costs of maintaining the system are high, but because of the strong political commitment to consumer welfare, reform proposals tend to focus on increasing targeting efficiency and reducing program costs.

The policy instruments used to pursue the agricultural goals are varied: price policy, quota deliveries, input subsidies, exchange rate management, and trade controls (1). The eight government entities that have principal jurisdiction in agricultural policy decisionmaking or responsibility for program implementation are the Council of Ministers, the Ministry of Agriculture and Land Reclamation (MOLAR), the Ministry of Supply and Home Trade (MOSHT), the Ministry of Irrigation, the Ministry of Industry, the Ministry of the Economy and Finance (MOEF), the Ministry of Planning, and the Principal Bank for Development and Agricultural Credit (PBDAC).

Producer Pricing Policies

During 1982-89, the Council of Ministers, upon the advice of the MOLAR, MOSHT, and MOEF, set fixed producer

prices for cereals, industrial crops, oilseeds, and fodder. For example, MOLAR suggested producer prices for cotton, wheat, sugarcane, rice, sesame, and peanuts. These prices supposedly covered production cost and left a profit margin for the farmer. Other ministries (MOEF and MOSHT) determined trade competitiveness and budgetary implications of the suggested price set. The Council of Ministers then officially voted on the price set, attempting to satisfy all pertinent concerns. The administered prices were generally below world price levels, and input costs, especially wage labor, increased faster than the increased producer prices. Most of the regulated commodities, in turn, were marketed through various government-controlled marketing boards and cooperatives. The free market determined the prices for other commodities, such as vegetables, fruits, fish, clover, meats, eggs, and dairy products.

Marketing Policies

The maintenance of the extensive consumer food subsidy system forces the Government to consider the effect of farm-gate prices on budget deficits and to project foreign exchange needs for imported food items. Because sugar and wheat flour are subsidized to consumers, the Government cannot provide a high price to producers without having a negative impact on the budget. The Government of Egypt has relied on delivery quotas or forced procurement from farmers, enforced by fines and imprisonment, to reduce budgetary costs and yet guarantee a cheap food supply. MOLAR and MOSHT are the principal implementors, specifying crop rotation schedules, setting production quotas, and procuring varying percentages of strategic crop harvests: wheat (more than 20 percent), cotton (100 percent), sugarcane (100 percent), and rice (50 percent). If a crop sustains less than a 100-percent procurement, the remainder is sold on free markets. After 1987, a year of economic reform, the list of procured crops dropped from nine to three. The currently procured crops are cotton, sugarcane, and rice.[2]

Input Policies

To lower production cost and to support farm income, MOLAR, the Ministry of Irrigation, and the PBDAC subsidize selected farm inputs: improved seeds, fertilizer, pesticides, irrigation water, machinery, credit, and electricity. Since arable land base is limited and perennial irrigation is needed, the combination of improved seeds, fertilizer, and pesticide is crucial to maintaining soil fertility and assuring high yields.

Direct subsidies have increased markedly since 1973, particularly for imported nitrogenous fertilizer. Domestic fertilizer prices (nitrogen, phosphate, and potash) have remained relatively constant in nominal terms since 1960. Potash prices have not changed, although those of nitrogenous and phosphatic fertilizers have increased but remain well below their respective international price levels. The MOLAR and the Department of Cooperatives also distribute disease-resistant or high-yielding varieties of seed at substantially below the market cost.

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[2]Cotton is nonedible but is a very important input into the large domestic textile industry.

The PBDAC extends credit at preferential rates (8 percent per year) for field crops, fruits and vegetables, livestock, and machinery. The ready availability of mechanization loans, the cheapened prices caused by an overvalued exchange rate, and rising wages have been key determinants in technological improvement in Egyptian agriculture (1). Virtually all plowing is mechanized, and irrigation pumps are widely used.

The Ministry of Irrigation provides free water to farmers. Because of a sharp decline in the water level behind the Aswan Dam in recent years, more attention is being paid to increasing the efficiency of water usage. Fewer than 20 percent of all farmers currently use modern irrigation techniques or have access to tiled drains. Water wastage is a major problem, contributing to salinization and decreased soil fertility (11).

Consumer Policies

MOSHT presents a set of consumer retail prices and ration quantities yearly for staples to the Council of Ministers for approval. In the current system, three types of food products are subsidized or rationed. First, wheat flour and bread are sold at a fixed, panterritorially uniform price in unlimited quantities. A network of government food stores and cooperatives, with the random inspections of licensed private grocery stores subject to penalties and fines for violators, makes price enforcement effective. Second, sugar, tea, cooking oil, rice, beans, and lentils are sold at subsidized prices and rationed in fixed monthly quotas, depending on the governorate and whether the household is rural or urban. Additional quantities are available in cooperatives and government food stores at prices higher but still below the free market level. Third, meat, poultry, and frozen fish are also subsidized in government stores (1).

The bulk of subsidized food items are marketed directly to consumers by MOSHT and its network of retail outlets. But the Ministry also handles procurement and distribution of such inputs as flour to bakers, vegetable oil to margarine manufacturers, and yellow corn to animal feed producers. Imported subsidized items, namely wheat, corn, and vegetable oil, are handled by the General Authority of Supply Commodities (GASC) at the behest of the MOSHT under a variety of licensing arrangements that serve to insulate and protect domestic pricing policies (1).

Another major implementor of the cheap food policy is PBDAC, which receives rice, beans, lentils, and wheat from domestic producers in lieu of cash payments for loans. The accumulated stocks are then sold to and distributed by MOSHT (1).

Estimation of Policy Intervention in Agriculture

Producer subsidy equivalents (PSE's) are aggregate measures of government intervention in the agricultural sector. They represent a useful quantitative measure of protection or taxation.

Five commodities are analyzed in this study: cotton, rice, sugar, wheat, and corn. These commodities and berseem (succulent clover) accounted for over 80 percent of the cultivated area (10). Two crops, cotton and rice, are large earners of foreign exchange. Wheat and sugar are important diet items and import substitutes, while corn is a major feed grain and substitute for wheat.

Several other commodities, namely vegetable oils, poultry, and tea, are important consumption items and are subject to government price intervention and trade control. These items were not included in this report for lack of sufficient data.

When we calculated the aggregate measures of intervention, we considered the following policy instruments: (1) marketing boards, (2) credit subsidies, (3) fertilizer subsidies, (4) improved seed subsidies, (5) pesticide subsidies, (6) irrigation water subsidies, (7) exchange rate overvaluation, and (8) foreign trade control. We excluded only two policies that affected farmer income levels: the indirect subsidies of government research and extension services and the exemption from income taxes. These policies were excluded for lack of budgetary data. Nonetheless, the policies covered were the major instruments of government intervention, transferring resources among various sectors in the society and having profound effects on producer incentives, budgetary outlays, and government financing needs.

Results for Producers

Egyptian government intervention in agriculture during 1982-89 succeeded in slightly lowering total cereal grain import dependence, from 48 percent to 46 percent, but failed to maximize foreign exchange earnings through neglect of the cotton sector (10).

The aggregate PSE for five commodities (wheat, corn, rice, sugar, and cotton) indicated a lower level of taxation (table 1). Between 1982 and 1984, producers were taxed at an average annual rate of 349 percent of their revenue. But, between 1987 and 1989, the taxes fell to an average of 175 percent per year.

Results by Commodity

The PSE pattern among commodities reflected the Government's attempt to raise revenue by taxing producers of cotton and rice, two export crops (table 2). Production of wheat, the most important food item, was also taxed, but at a lower rate. Corn, a nonstrategic commodity but an important feed grain, was consistently supported through the study period.

Sugarcane was consistently taxed but at a declining rate. Taxes to producers exceeded 500 percent of revenue in 1982 but fell markedly to 170 percent by 1989. The principal cause was an average annual price rise for producers of 15 percent, which far outstripped increases in world prices.

Through most of the years evaluated, rice producers were taxed more heavily than the other producers relative to the value of their crops. Output remained virtually unchanged between 1982 and 1989.

Taxes on cotton producers remained steady through 1987 but increased significantly in 1988 and 1989 (fig. 1). In 1989,

Table 1--Egypt: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Pesticide subsidy	Mil. LE	74	65	66	91	103	105	113	120
Seed subsidy	Mil. LE	170	170	183	192	202	234	265	305
Irrigation subsidy	Mil. LE	40	45	50	51	54	59	72	32
Fertilizer subsidy	Mil. LE	95	107	109	114	111	138	165	188
Credit subsidy	Mil. LE	10	10	9	13	19	20	31	41
Price subsidy	Mil. LE	-901	-742	-983	-1,418	-2,062	-3,420	-4,481	-10,234
Foreign exchange	Mil. LE	-7,556	-5,328	-4,213	-4,288	-3,472	-2,619	-2,119	0
Policy transfers by commodity:									
Wheat	Mil. LE	-1,259	-927	-552	-488	-389	-391	-525	-232
Corn	Mil. LE	83	102	113	127	109	140	183	214
Rice	Mil. LE	-3,174	-1,922	-1,383	-1,128	-1,083	-1,446	-478	-543
Sugar	Mil. LE	-990	-640	-488	-624	-678	-1,463	-820	-877
Cotton	Mil. LE	-2,732	-2,289	-2,472	-3,131	-3,004	-2,332	-4,325	-8,062
PSE by commodity:									
Wheat	Percent	-869	-498	-303	-180	-130	-95	-82	-22
Corn	Percent	20	17	18	17	16	15	13	11
Rice	Percent	-1,949	-1,242	-870	-469	-369	-429	-119	-79
Sugar	Percent	-521	-349	-233	-228	-213	-413	-185	-170
Cotton	Percent	-356	-322	-362	-414	-363	-285	-470	-745
Total policy transfers	Mil. LE	-8,072	-5,675	-4,782	-5,244	-5,045	-5,491	-5,964	-9,499
Value to producers	Mil. LE	1,683	1,825	1,872	2,311	2,434	2,873	3,843	5,293
Total commodity PSE	Percent	-480	-311	-255	-227	-207	-191	-155	-179

LE = Egyptian pound.
PSE = Producer subsidy equivalent.

Table 2—Egypt: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	2,017	1,996	1,815	1,874	1,929	2,443	2,839	3,183
Procurement quota	1,000 tons	214	87	184	114	134	143	150	190
Producer price	LE/ton	89	109	124	172	186	200	266	400
Procurement price	LE/ton	89	89	100	137	167	167	266	400
Value to producers	Mil. LE	145	186	182	271	300	412	641	1,074
Policy transfers to producers--									
Seed subsidy	Mil. LE	32	36	40	47	52	73	97	111
Irrigation subsidy	Mil. LE	9	11	10	12	13	12	16	21
Fertilizer subsidy	Mil. LE	26	30	25	26	29	37	43	48
Credit subsidy	Mil. LE	2	2	2	3	5	5	8	10
Price subsidy	Mil. LE	-179	-136	-89	-66	-103	-204	-366	-422
Foreign exchange	Mil. LE	-1,149	-869	-541	-509	-385	-314	-322	0
Total policy transfers	Mil. LE	-1,259	-927	-552	-488	-389	-391	-525	-232
PSE (per unit value)	Percent	-869	-498	-303	-180	-130	-95	-82	-22
PSE (per unit quantity)	LE/ton	-624	-464	-304	-260	-202	-160	-185	-73
	US$/ton	-600	-418	-254	-193	-113	-73	-80	-28
Corn:									
Level of production	1,000 tons	3,347	3,509	3,698	3,699	2,918	3,619	4,287	4,524
Producer price	LE/ton	125	168	173	208	238	263	335	427
Value to producers	Mil. LE	418	590	640	769	694	952	1,436	1,932
Policy transfers to producers--									
Pesticide subsidy	Mil. LE	0	0	0	7	6	7	9	9
Seed subsidy	Mil. LE	27	35	37	37	29	36	47	54
Irrigation subsidy	Mil. LE	12	14	17	19	16	17	22	28
Fertilizer subsidy	Mil. LE	40	49	55	59	53	72	94	109
Credit subsidy	Mil. LE	3	3	3	5	6	7	11	14
Price subsidy	Mil. LE	NA	NA	NA	NA	NA	NA	NA	NA
Foreign exchange	Mil. LE	NA	NA	NA	NA	NA	NA	NA	NA
Total policy transfers	Mil. LE	83	102	113	127	109	140	183	214
PSE (per unit value)	Percent	20	17	18	17	16	15	13	11
PSE (per unit quantity)	LE/ton	25	29	30	34	37	39	43	47
	US$/ton	24	26	25	25	21	18	18	19
Rice:									
Level of production	1,000 tons	2,438	2,442	2,330	2,312	2,445	2,406	2,132	2,670
Procurement quota	1,000 tons	1,170	1,148	1,025	1,064	1,125	1,155	853	801
Producer price	LE/ton	166	144	158	272	298	378	440	600
Procurement price	LE/ton	95	105	105	125	165	165	265	275
Value to producers	Mil. LE	163	155	159	240	294	337	401	689
Policy transfers to producers--									
Pesticide subsidy	Mil. LE	0	0	0	3	8	9	8	10
Seed subsidy	Mil. LE	80	63	65	62	71	72	64	80
Irrigation subsidy	Mil. LE	7	8	8	9	11	9	9	14
Fertilizer subsidy	Mil. LE	15	15	15	14	17	17	15	19
Credit subsidy	Mil. LE	2	2	2	2	4	4	5	7
Price subsidy	Mil. LE	-535	-361	-336	-255	-386	-862	-274	-673
Foreign exchange	Mil. LE	-2,743	-1,649	-1,137	-964	-808	-696	-305	0
Total policy transfers	Mil. LE	-3,174	-1,922	-1,383	-1,128	-1,083	-1,446	-478	-543
PSE (per unit value)	Percent	-1,949	-1,242	-870	-469	-369	-429	-119	-79
PSE (per unit quantity)	LE/ton	-1,302	-787	-593	-488	-443	-601	-224	-203
	US$/ton	-1,252	-709	-494	-361	-247	-273	-97	-79
Sugar:									
Level of production	1,000 tons	961	927	950	1,037	1,065	1,056	1,187	1,233
Producer price	LE/ton	198	198	220	264	299	336	374	418
Value to producers	Mil. LE	190	184	209	274	319	354	444	515
Policy transfers to producers--									
Seed subsidy	Mil. LE	23	28	33	36	39	38	43	45
Irrigation subsidy	Mil. LE	2	2	2	2	3	3	3	4
Fertilizer subsidy	Mil. LE	2	3	3	3	3	3	5	5
Credit subsidy	Mil. LE	0	0	0	1	1	1	2	2
Price subsidy	Mil. LE	-97	-64	-58	-131	-249	-924	-579	-933
Foreign exchange	Mil. LE	-921	-610	-468	-536	-475	-584	-293	0
Total policy transfers	Mil. LE	-990	-640	-488	-624	-678	-1,463	-820	-877
PSE (per unit value)	Percent	-521	-349	-233	-228	-213	-413	-185	-170
PSE (per unit quantity)	LE/ton	-1,031	-690	-513	-602	-637	-1,385	-691	-711
	US$/ton	-991	-622	-428	-446	-356	-630	-299	-278

See footnotes at end of table.   Continued--

**Table 2–Egypt: Producer subsidy equivalents by commodity--Continued**

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Cotton:									
Level of production	1,000 tons	461	419	399	435	401	351	322	296
Producer price	LE/ton	1,663	1,698	1,711	1,738	2,064	2,329	2,858	3,658
Value to producers	Mil. LE	767	711	683	756	828	817	920	1,083
Policy transfers to producers--									
Pesticide subsidy	Mil. LE	74	65	66	80	89	88	96	101
Seed subsidy	Mil. LE	7	8	8	9	11	14	15	15
Irrigation subsidy	Mil. LE	7	8	8	11	11	9	11	14
Fertilizer subsidy	Mil. LE	12	11	10	12	10	9	8	8
Credit subsidy	Mil. LE	2	2	2	3	4	4	6	7
Price subsidy	Mil. LE	-90	-181	-499	-966	-1,324	-1,430	-3,261	-8,206
Foreign exchange	Mil. LE	-2,743	-2,201	-2,067	-2,280	-1,803	-1,025	-1,200	0
Total policy transfers	Mil. LE	-2,732	-2,289	-2,472	-3,131	-3,004	-2,332	-4,325	-8,062
PSE (per unit value)	Percent	-356	-322	-362	-414	-363	-285	-470	-745
PSE (per unit quantity)	LE/ton	-5,925	-5,462	-6,197	-7,199	-7,491	-6,643	-13,431	-27,235
	US$/ton	-5,697	-4,921	-5,164	-5,332	-4,185	-3,019	-5,814	-10,639

NA = Not applicable.
LE = Egyptian pound.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

these taxes were valued at more than eight times producer revenue. This tax value can be attributed to the fact that the export prices for Egyptian cotton were increasing at a much faster rate than producer prices.

Figure 1

Egypt: Cotton producer subsidy equivalent
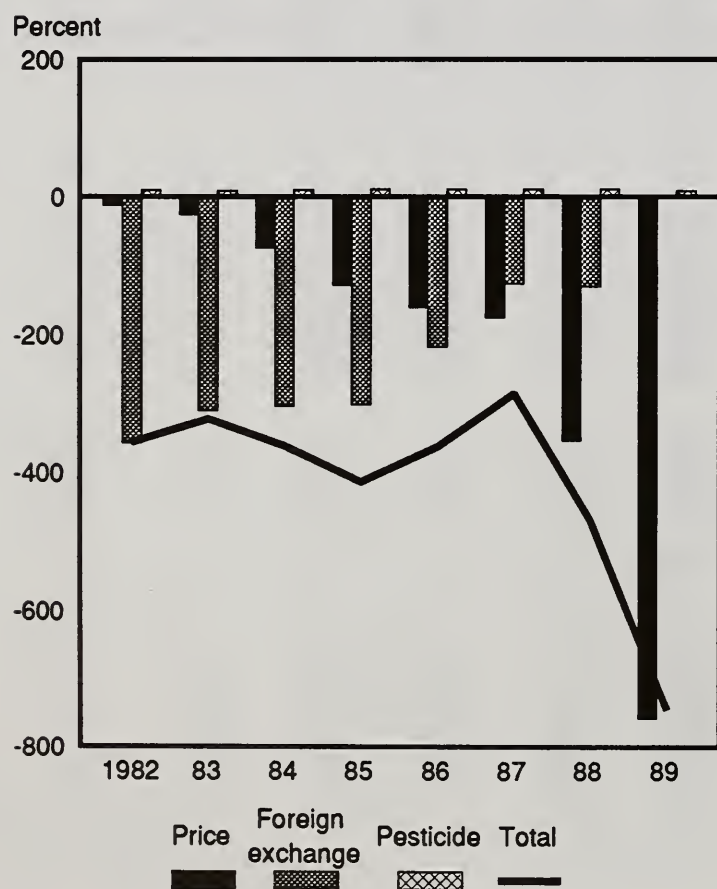
Corn was consistently supported at a modest level of 11-20 percent of producer revenue. Since corn is an unregulated, nontradeable commodity, it benefited from input subsidies and avoided the negative effects of exchange rate overvaluation and government procurement. However, corn is a substitute for wheat, and inexpensive wheat imports dampen domestic free market prices of corn. Thus, there is an implicit tax that cannot be calculated without access to reliable cross-price elasticities.

Taxes on wheat producers followed a pattern similar to that on other Egyptian producers (fig. 2). After averaging more than five times producer revenue in 1982-84, taxes fell to less than 50 percent of revenues in 1987-89.

Results by Policy

The policy most responsible for transferring resources to or from producers through 1986 was the foreign exchange policy. Egypt's policy of overvaluing the pound resulted in taxes to the producers. These taxes exhibited a declining trend, however, reflecting a lowered rate of overvaluation.

The second most influential policy for Egyptian producers was the pricing policy. Egypt's policy of setting producer prices below world levels resulted in taxes on producers through the entire study period. These taxes generally increased over time.

The third most important policy was the distribution of highly subsidized improved seed varieties. During the study period, farmers received an average annual subsidy of LE215 million. Farmers also benefited from fertilizer subsidies, averaging LE128 million.

The other input subsidies, credit, pesticides, and irrigation, played a modest role. The indirect effects of the trade licensing on wheat and rice also played a minor role.

Figure 2
Egypt: Wheat producer subsidy equivalents
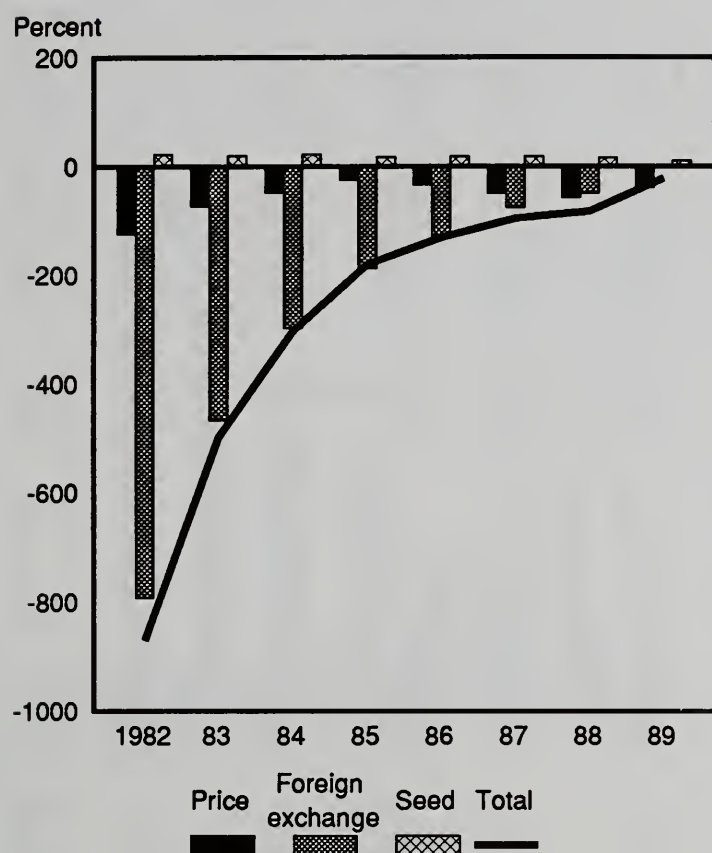
Percent

Price | Foreign exchange | Seed | Total

tenance of an extensive consumer subsidy system. The results of the CSE calculations reflect this subsidy system, although to a lesser extent in the more recent years. Policy transfers averaged six times consumer cost in 1982-84 but fell to less than two times this cost in 1987-89 (table 3). This trend reflects the new policy of reducing consumer subsidies.

The elaborate food subsidy system benefited consumers for a time, but it also distorted producer incentives and proved increasingly expensive to operate. Per capita cereal consumption per year increased from 240 kilograms in 1982 to 245 kilograms in 1989 (9). However, budgetary costs have increased. Subsidies for wheat, for example, rose from less than 1 percent of the government budget in 1960 to 3.4 percent in the mideighties. Likewise, wheat subsidies as a percentage of the public deficit rose from 1 percent to 7.6 percent during the same period.

Results by Commodity

In terms of total resources transferred, wheat consumers received the most support through the study period (table 4). Although subsidies to wheat consumers declined over the years, such subsidies exceeded LE2.4 billion in 1989, or 76 percent of consumer cost (fig. 3). Rice consumers received the largest subsidies relative to the crop cost. These subsidies averaged well over 1,000 percent in the early years but fell to about 120 percent in more recent years. Corn consumers received the smallest subsidies and were even taxed in 1989.

Results by Policy

Egypt's foreign exchange policy was more influential than the pricing policy in determining transfers to Egyptian consumers through 1986. Overvaluation of the pound provided a subsidy to Egyptian consumers through the period except in 1989. In 1987-89, the subsidy resulting from the maintenance of low consumer prices outweighed the foreign exchange subsidy.

Results for Consumers

Consumer subsidy equivalents (CSE's), which measure government intervention in pricing and exchange rates, were calculated in this study for wheat, corn, and rice. As mentioned previously, Egypt's agricultural policy emphasized the main-

Table 3—Egypt: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. LE	1,241	1,018	990	1,361	1,812	2,366	3,192	3,263
Foreign exchange	Mil. LE	8,021	5,730	4,070	3,673	2,718	1,888	1,490	0
Policy transfers by commodity:									
Wheat	Mil. LE	4,916	4,166	3,071	3,287	2,939	2,677	3,811	2,406
Corn	Mil. LE	1,048	497	457	295	116	13	89	-29
Rice	Mil. LE	3,298	2,086	1,533	1,452	1,475	1,563	783	886
CSE by commodity:									
Wheat	Percent	534	419	297	304	262	239	320	76
Corn	Percent	724	456	435	362	227	11	36	-9
Rice	Percent	1,677	1,042	774	578	572	294	139	111
Total policy transfers	Mil. LE	9,262	6,749	5,061	5,034	4,529	4,253	4,682	3,263
Cost to consumers	Mil. LE	1,263	1,304	1,337	1,413	1,432	1,771	2,002	4,279
Total commodity CSE	Percent	733	517	378	356	316	240	234	76

LE = Egyptian pound.
CSE = Consumer subsidy equivalent.

Table 4—Egypt: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	7,809	8,434	8,764	9,157	9,283	9,259	9,839	10,483
Wholesale price	LE/ton	118	118	118	118	121	121	121	303
Cost to consumers	Mil. LE	921	995	1,034	1,081	1,123	1,120	1,191	3,176
Policy transfers to consumers:									
Price subsidy	Mil. LE	467	493	459	798	1,087	1,487	2,696	2,406
Foreign exchange	Mil. LE	4,449	3,673	2,612	2,488	1,852	1,190	1,115	0
Total policy transfers	Mil. LE	4,916	4,166	3,071	3,287	2,939	2,677	3,811	2,406
CSE (per unit value)	Percent	534	419	297	304	262	239	320	76
CSE (per unit quantity)	LE/ton	630	494	350	359	317	289	387	229
	US$/ton	605	445	292	266	177	131	168	90
Corn:									
Level of consumption	1,000 tons	1,340	991	907	792	438	489	599	614
Wholesale price	LE/ton	108	110	116	103	116	242	416	500
Cost to consumers	Mil. LE	145	109	105	82	51	118	249	307
Policy transfers to consumers:									
Price subsidy	Mil. LE	139	66	99	81	40	-28	13	-29
Foreign exchange	Mil. LE	909	431	358	215	76	41	75	0
Total policy transfers	Mil. LE	1,048	497	457	295	116	13	89	-29
CSE (per unit value)	Percent	724	456	435	362	227	11	36	-9
CSE (per unit quantity)	LE/ton	782	502	504	373	264	27	148	-47
	US$/ton	752	452	420	276	147	12	64	-18
Rice:									
Level of consumption	1,000 tons	1,586	1,614	1,512	1,560	1,601	1,521	1,405	1,493
Wholesale price	LE/ton	124	124	131	161	161	350	400	533
Cost to consumers	Mil. LE	197	200	198	251	258	532	562	796
Policy transfers to consumers:									
Price subsidy	Mil. LE	635	459	432	482	685	907	483	886
Foreign exchange	Mil. LE	2,663	1,627	1,101	970	790	657	300	0
Total policy transfers	Mil. LE	3,298	2,086	1,533	1,452	1,475	1,563	783	886
CSE (per unit value)	Percent	1,677	1,042	774	578	572	294	139	111
CSE (per unit quantity)	LE/ton	2,079	1,292	1,014	931	921	1,028	557	593
	US$/ton	1,999	1,164	845	690	515	467	241	232

LE = Egyptian pound.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

Conclusions

The major constraints facing Egyptian policymakers are (1) a limited agricultural base of less than 3 percent of total land area, (2) a high annual population growth rate of 2.4 percent, and (3) an untenable system of food security. Egypt has a comparative advantage in cotton, but this crop competes for land and water resources with food crops. Policymakers are hesitant to commit to the high-risk strategy of export-led development, yet at the same time, the current food subsidy system can be financed only through foreign concessional aid, which further increases Egypt's dependence on donors. Efficiency losses also result from the panoply of trade restrictions (bans on imported high-valued products, licenses on cereals, and high tariffs) needed to defend domestic food-pricing policies. Increasing the targeting efficiency of the food subsidy program, penetrating foreign markets for high-valued commodities, and continuing the agricultural liberalization are emerging as the new goals of the Egyptian Government.

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Figure 3

Egypt: Wheat consumer subsidy equivalent

Percent

Price Foreign exchange Total
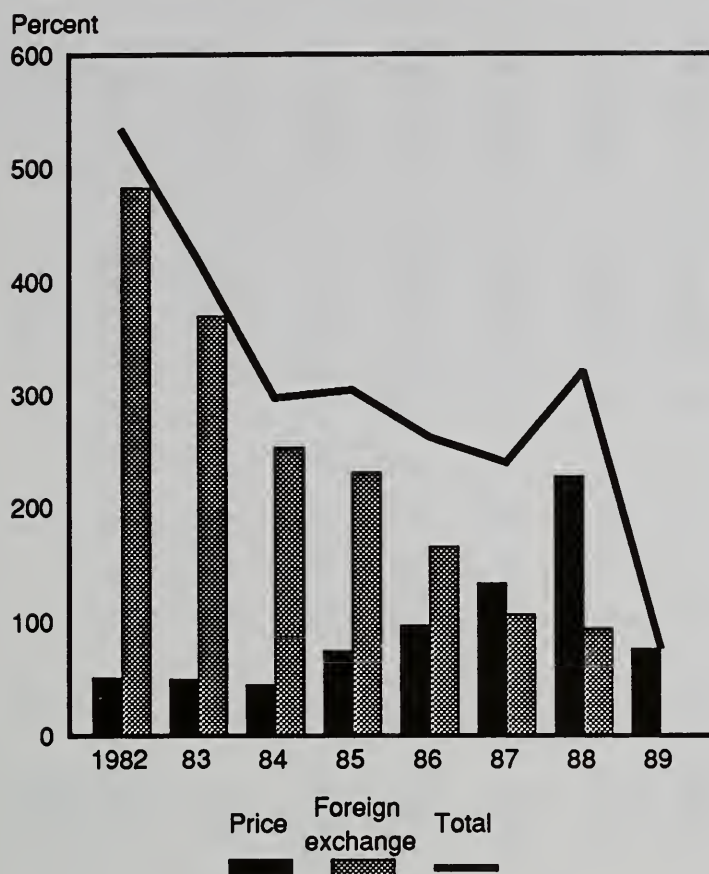
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Appendix: Methodology

Pricing Policy

The marketing board PSE was estimated to be the difference between the border price and the procurement price multiplied by the procured quantity. For cotton, which has joint products, lint and seed, the border price of lint was adjusted back to unseparated farmgate cotton and compared with the domestic procurement price. For sugarcane, the border price was similarly adjusted back to farmgate accounting for processing and transportation.

Exchange Rate Policy

An equilibrium exchange rate was calculated by multiplying the index of real effective exchange rates and the 1989 official exchange rate (5). After several years of devaluation, the pound was assumed to be at an equilibrium level in 1989. The difference between the equilibrium rate and the official rate represents the distortion caused by exchange rate policy. This difference was multiplied by the volume of production (or consumption) and by the product price to determine exchange rate transfers.

Trade Control Policy

The Egyptian Government bans the export of wheat and monopolizes the trade of sugar, rice, cotton, wheat, and corn. Because the combined price and trade control effects cannot be adequately separated for cotton, corn, and sugar, the estimated effects of intervention on only rice and wheat are included in this study. During the 1982-87 period, wheat farmers had to sell all amounts over the procured quota on the domestic free market. The trade PSE was calculated for rice and wheat, both of which were less than fully procured commodities, to be the difference between the border price and domestic price for nonquota production multiplied by the nonprocured production.

Credit Policy

The credit PSE was calculated by the amount of credit disbursed by crop area multiplied by the differential between the lending rate of the PBDAC and the Central Bank rate, the latter serving as the opportunity cost of loan capital.

Inputs Policy

Each of the input PSE's was estimated from budget data on direct subsidies and allocated to each crop, based on share in total area cropped.

Irrigation Policy

The irrigation subsidy is derived from the Ministry of Irrigation's Operations and Maintenance budget. The subsidy value for each crop was determined by weighting the yearly expenditure figure by the ratio of specific crop area to total crop area irrigated.

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Appendix table 1—Wheat: Calculation of Egypt's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 fd.	1,324	1,357	1,169	1,186	1,267	1,379	1,421	1,457
B. Production	1,000 tons	2,017	1,996	1,815	1,874	1,929	2,443	2,839	3,183
BB. Procurement quota	1,000 tons	214	87	184	114	134	143	150	190
C. Producer price	LE/ton	89	109	124	172	186	200	266	400
CC. Quota price	LE/ton	89	89	100	137	167	167	266	400
D. Producer value (B*C)/1,000	Mil. LE	145	186	182	271	300	412	641	1,074
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	LE/ton	89	109	124	172	186	200	266	400
aa. Quota price	LE/ton	89	89	100	137	167	167	266	400
b. Border price, import unit value	US$/ton	171	159	142	152	133	128	171	208
c. Border price, import unit value	LE/ton	178	176	170	205	238	282	395	532
d. Price support, quota (1aa-1c)*BB/1,000	Mil. LE	-19	-8	-13	-8	-10	-16	-19	-25
e. Price support, nonquota (1a-1c)*(B-BB)/1,000	Mil. LE	-160	-129	-76	-58	-93	-188	-347	-397
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	748	612	468	477	438	410	508	532
d. Foreign exchange subsidy, quota (1c-2c)*BB/1,000	Mil. LE	-122	-38	-55	-31	-27	-18	-17	0
e. Foreign exchange subsidy, nonquota (1c-2c)*(B-BB)/1,000	Mil. LE	-1,027	-831	-486	-478	-358	-296	-305	0
3. Fertilizer transfers--									
a. Fertilizer, wheat	LE/ton	13	15	14	14	15	15	15	15
b. Fertilizer PSE (3a*B)/1,000	Mil. LE	26	30	25	26	29	37	43	48
4. Credit transfers--									
a. Wheat area	1,000 fd.	1,324	1,357	1,169	1,186	1,267	1,379	1,421	1,457
b. Total area harvested	1,000 fd.	11,181	11,097	11,043	11,220	11,170	12,200	12,230	12,320
c. Total credit	Mil. LE	197	201	183	276	416	450	686	870
d. Credit subsidy (4a/4b)*4c*0.1	Mil. LE	2	2	2	3	5	5	8	10
5. Seed transfers--									
a. Seed allocation, wheat	LE/ton	16	18	22	25	27	30	34	35
b. Seed subsidy (5a*B)/1,000	Mil. LE	32	36	40	47	52	73	97	111
6. Irrigation transfers--									
a. Irrigation expenditure	Mil. LE	72	88	95	110	114	110	138	174
b. Irrigation subsidy (6a/4b)*4a	Mil. LE	9	11	10	12	13	12	16	21
F. Total transfers to producers:									
1. Total (1d+1e+2d+2e+3b+4d+5b+6b)	Mil. LE	-1,259	-927	-552	-488	-389	-391	-525	-232
2. Producer subsidy equivalents (F1/D)*100	Percent	-869	-498	-303	-180	-130	-95	-82	-22
G. Consumption	1,000 tons	7,809	8,434	8,764	9,157	9,283	9,259	9,839	10,483
H. Consumer price, bread (grain equivalent)	LE/ton	118	118	118	118	121	121	121	303
I. Consumer cost (G*H)/1,000	Mil. LE	921	995	1,034	1,081	1,123	1,120	1,191	3,176
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, import unit value	LE/ton	178	176	170	205	238	282	395	532
b. Consumer price, bread (grain equivalent)	LE/ton	118	118	118	118	121	121	121	303
c. Price support (1a-1b)*G/1,000	Mil. LE	467	493	459	798	1,087	1,487	2,696	2,406
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	748	612	468	477	438	410	508	532
d. Foreign exchange subsidy (2c-1a)*G/1,000	Mil. LE	4,449	3,673	2,612	2,488	1,852	1,190	1,115	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. LE	4,916	4,166	3,071	3,287	2,939	2,677	3,811	2,406
2. Consumer subsidy equivalents (K1/I)*100	Percent	534	419	297	304	262	239	320	76

fd. = 0.43 hectares.
LE = Egyptian pound.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Appendix table 2—Corn: Calculation of Egypt's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 fd.	1,936	1,800	1,974	1,914	1,531	1,879	1,964	2,007
B. Production	1,000 tons	3,347	3,509	3,698	3,699	2,918	3,619	4,287	4,524
C. Producer price	LE/ton	125	168	173	208	238	263	335	427
D. Producer value (B*C)/1,000	Mil. LE	418	590	640	769	694	952	1,436	1,932
E. Policy transfers to producers:									
1. Fertilizer transfers--									
a. Fertilizer, corn	LE/ton	12	14	15	16	18	20	22	24
b. Fertilizer PSE (1a*B)/1,000	Mil. LE	40	49	55	59	53	72	94	109
2. Credit transfers--									
a. Corn area	1,000 fd.	1,936	1,800	1,974	1,914	1,531	1,879	1,964	2,007
b. Total area harvested	1,000 fd.	11,181	11,097	11,043	11,220	11,170	12,200	12,230	12,320
c. Total credit	Mil. LE	197	201	183	276	416	450	686	870
d. Credit subsidy (2a/2b)*2c*0.1	Mil. LE	3	3	3	5	6	7	11	14
3. Seed transfers--									
a. Seed allocation, corn	LE/ton	8	10	10	10	10	10	11	12
b. Seed subsidy (3a*B)/1,000	Mil. LE	27	35	37	37	29	36	47	54
4. Irrigation transfers--									
a. Irrigation expenditure	Mil. LE	72	88	95	110	114	110	138	174
b. Irrigation subsidy (4a/2b)*2a	Mil. LE	12	14	17	19	16	17	22	28
5. Pesticide transfers--									
a. Pesticide allocation, corn	LE/ton	0	0	0	2	2	2	2	2
b. Pesticide subsidy (5a*B)/1,000	Mil. LE	0	0	0	7	6	7	9	9
F. Total transfers to producers:									
1. Total (1b+2d+3b+4b+5b)	Mil. LE	83	102	113	127	109	140	183	214
2. Producer subsidy equivalents (F1/D)*100	Percent	20	17	18	17	16	15	13	11
G. Consumption	1,000 tons	1,340	991	907	792	438	489	599	614
H. Consumer price	LE/ton	108	110	116	103	116	242	416	500
I. Consumer cost (G*H)/1,000	Mil. LE	145	109	105	82	51	118	249	307
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, import unit value	LE/ton	212	176	226	205	207	185	438	453
b. Consumer price	LE/ton	108	110	116	103	116	242	416	500
c. Price support (1a-1b)*G/1,000	Mil. LE	139	66	99	81	40	-28	13	-29
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	890	612	620	476	380	269	564	453
d. Foreign exchange subsidy (2c-1a)*G/1,000	Mil. LE	909	431	358	215	76	41	75	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. LE	1,048	497	457	295	116	13	89	-29
2. Consumer subsidy equivalents (K1/I)*100	Percent	724	456	435	362	227	11	36	-9

fd. = 0.43 hectares.
LE = Egyptian pound.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Appendix table 3—Rice: Calculation of Egypt's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 fd.	1,026	1,007	981	926	1,081	1,000	814	981
B. Production, paddy	1,000 tons	2,438	2,442	2,330	2,312	2,445	2,406	2,132	2,670
BB. Procurement quota, paddy	1,000 tons	1,170	1,148	1,025	1,064	1,125	1,155	853	801
C. Producer price, paddy	LE/ton	166	144	158	272	298	378	440	600
CC. Procurement price, paddy	LE/ton	95	105	105	125	165	165	265	275
D. Producer value (B*C)/1,000	Mil. LE	163	155	159	240	294	337	401	689
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price, milled	LE/ton	248	215	236	406	445	564	657	896
aa. Procurement price, milled	LE/ton	142	157	157	187	246	246	396	410
b. Border price, import unit value	US$/ton	504	368	347	348	329	430	322	440
c. Border price, milled	LE/ton	524	408	416	470	589	946	744	1,126
d. Price support, quota (1aa-1c)*(BB*.67)/1,000	Mil. LE	-300	-194	-178	-202	-258	-541	-199	-384
e. Price support, nonquota (1a-1c)*((B-BB)*.67)/1,000	Mil. LE	-235	-168	-158	-53	-127	-320	-75	-289
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	2,203	1,416	1,145	1,092	1,082	1,378	957	1,126
d. Foreign exchange subsidy, quota (1c-2c)*(BB*.67)/1,000	Mil. LE	-1,316	-775	-500	-443	-372	-334	-122	0
e. Foreign exchange subsidy, nonquota (1c-2c)*((B-BB)*.67)/1,000	Mil. LE	-1,427	-874	-637	-520	-436	-362	-183	0
3. Fertilizer transfers--									
a. Fertilizer allocation, rice	LE/ton	6	6	7	6	7	7	7	7
b. Fertilizer PSE (3a*B)/1,000	Mil. LE	15	15	15	14	17	17	15	19
4. Credit transfers--									
a. Rice area	1,000 fd.	1,026	1,007	981	926	1,081	1,000	814	981
b. Total area harvested	1,000 fd.	11,181	11,097	11,043	11,220	11,170	12,200	12,230	12,320
c. Total credit	Mil. LE	197	201	183	276	416	450	686	870
d. Credit subsidy (4a/4b)*4c*0.1	Mil. LE	2	2	2	2	4	4	5	7
5. Seed transfers--									
a. Seed allocation, rice	LE/ton	33	26	28	27	29	30	30	30
b. Seed subsidy (5a*B)/1,000	Mil. LE	80	63	65	62	71	72	64	80
6. Irrigation transfers--									
a. Irrigation expenditure	Mil. LE	72	88	95	110	114	110	138	174
b. Irrigation subsidy (6a/4b)*4a	Mil. LE	7	8	8	9	11	9	9	14
7. Pesticide transfers--									
a. Pesticide allocation, rice	LE/ton	0	0	0	1	3	4	4	4
b. Pesticide subsidy 7a*B/1,000	Mil. LE	0	0	0	3	8	9	8	10
F. Total transfers to producers:									
1. Total (1d+1e+2d+2e+3b+4d+5b+6b+7b)	Mil. LE	-3,174	-1,922	-1,383	-1,128	-1,083	-1,446	-478	-543
2. Producer subsidy equivalents (F1/D)*100	Percent	-1,949	-1,242	-870	-469	-369	-429	-119	-79
G. Consumption	1,000 tons	1,586	1,614	1,512	1,560	1,601	1,521	1,405	1,493
H. Consumer price	LE/ton	124	124	131	161	161	350	400	533
I. Consumer cost (G*H)/1,000	Mil. LE	197	200	198	251	258	532	562	796
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price	LE/ton	524	408	416	470	589	946	744	1,126
b. Consumer price	LE/ton	124	124	131	161	161	350	400	533
c. Price support (1a-1b)*G/1,000	Mil. LE	635	459	432	482	685	907	483	886
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	2,203	1,416	1,145	1,092	1,082	1,378	957	1,126
d. Foreign exchange subsidy (2c-1a)*G/1,000	Mil. LE	2,663	1,627	1,101	970	790	657	300	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. LE	3,298	2,086	1,533	1,452	1,475	1,563	783	886
2. Consumer subsidy equivalents (K1/I)*100	Percent	1,677	1,042	774	578	572	294	139	111

fd. = 0.43 hectares.
LE = Egyptian pound.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Appendix table 4--Sugar: Calculation of Egypt's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 fd.	264	260	257	250	272	284	269	286
B. Production	1,000 tons	961	927	950	1,037	1,065	1,056	1,187	1,233
C. Producer price	LE/ton	198	198	220	264	299	336	374	418
D. Producer value (B*C)/1,000	Mil. LE	190	184	209	274	319	354	444	515
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	LE/ton	198	198	220	264	299	336	374	418
b. Border price, import unit value	US$/ton	288	240	235	289	298	550	373	459
c. Border price, import unit value	LE/ton	299	267	282	390	533	1,211	862	1,175
d. Price support (1a-1c)*B/1,000	Mil. LE	-97	-64	-58	-131	-249	-924	-579	-933
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	1,257	924	774	907	979	1,763	1,109	1,175
d. Foreign exchange subsidy (1c-2c)*B/1,000	Mil. LE	-921	-610	-468	-536	-475	-584	-293	0
3. Fertilizer transfers--									
a. Fertilizer allocation, sugar	LE/ton	2	3	3	3	3	3	4	4
b. Fertilizer PSE (3a*B)/1,000	Mil. LE	2	3	3	3	3	3	5	5
4. Credit transfers--									
a. Sugar area	1,000 fd.	264	260	257	250	272	284	269	286
b. Total area harvested	1,000 fd.	11,181	11,097	11,043	11,220	11,170	12,200	12,230	12,320
c. Total credit	Mil. LE	197	201	183	276	416	450	686	870
d. Credit subsidy (4a/4b)*4c*0.1	Mil. LE	0	0	0	1	1	1	2	2
5. Seed transfers--									
a. Seed allocation, sugar	LE/ton	3	3	4	4	4	4	4	4
b. Seed subsidy (5a*B)/1,000	Mil. LE	23	28	33	36	39	38	43	45
6. Irrigation transfers--									
a. Irrigation expenditure	Mil. LE	72	88	95	110	114	110	138	174
b. Irrigation subsidy (6a/4b)*4a	Mil. LE	2	2	2	2	3	3	3	4
F. Total transfers to producers:									
1. Total (1d+2d+3b+4d+5b+6b)	Mil. LE	-990	-640	-488	-624	-678	-1,463	-820	-877
2. Producer subsidy equivalents (F1/D)*100	Percent	-521	-349	-233	-228	-213	-413	-185	-170

fd. = 0.43 hectares.
LE = Egyptian pound.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Appendix table 5--Cotton: Calculation of Egypt's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 fd.	1,066	998	984	1,081	1,055	980	1,010	1,005
B. Production, lint	1,000 tons	461	419	399	435	401	351	322	296
C. Procurement price, lint	LE/ton	1,663	1,698	1,711	1,738	2,064	2,329	2,858	3,658
D. Producer value (B*C)/1,000	Mil. LE	767	711	683	756	828	817	920	1,083
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	LE/ton	1,663	1,698	1,711	1,738	2,064	2,329	2,858	3,658
b. Border price, import unit value	US$/ton	1,786	1,918	2,469	2,932	2,998	2,910	5,622	12,258
c. Border price, lint	LE/ton	1,857	2,129	2,963	3,958	5,366	6,402	12,987	31,380
d. Price support (1a-1c)*B/1,000	Mil. LE	-90	-181	-499	-966	-1,324	-1,430	-3,261	-8,206
2. Foreign exchange policy--									
a. Official exchange rate	LE/US$	1	1	1	1	2	2	2	3
b. Equilibrium exchange rate	LE/US$	4	4	3	3	3	3	3	3
c. Border price, equilibrium exchange rate	LE/ton	7,808	7,382	8,144	9,199	9,863	9,324	16,712	31,380
d. Foreign exchange subsidy (1c-2c)*B/1,000	Mil. LE	-2,743	-2,201	-2,067	-2,280	-1,803	-1,025	-1,200	0
3. Fertilizer transfers--									
a. Fertilizer allocation, cotton	LE/ton	26	26	26	27	24	25	26	27
b. Fertilizer PSE (3a*B)/1,000	Mil. LE	12	11	10	12	10	9	8	8
4. Credit transfers--									
a. Cotton area	1,000 fd.	1,066	998	984	1,081	1,055	980	1,010	1,005
b. Total area harvested	1,000 fd.	11,181	11,097	11,043	11,220	11,170	12,200	12,230	12,320
c. Total credit	Mil. LE	197	201	183	276	416	450	686	870
d. Credit subsidy (4a/4b)*4c*0.1	Mil. LE	2	2	2	3	4	4	6	7
5. Seed transfers--									
a. Seed allocation, cotton	LE/fd.	7	8	8	9	10	14	14	14
b. Seed subsidy (5a*A)/1,000	Mil. LE	7	8	8	9	11	14	15	15
6. Irrigation transfers-- ,									
a. Irrigation expenditure	Mil. LE	72	88	95	110	114	110	138	174
b. Irrigation subsidy (6a/4b)*4a	Mil. LE	7	8	8	11	11	9	11	14
7. Pesticide transfers--									
a. Pesticide allocation, cotton	LE/fd.	69	65	67	74	84	90	95	100
b. Pesticide subsidy	Mil. LE	74	65	66	80	89	88	96	101
F. Total transfers to producers:									
1. Total (1d+2d+3b+4d+5b+6b+7b)	Mil. LE	-2,732	-2,289	-2,472	-3,131	-3,004	-2,332	-4,325	-8,062
2. Producer subsidy equivalents (F1/D)*100	Percent	-356	-322	-362	-414	-363	-285	-470	-745

fd. = 0.43 hectares.
LE = Egyptian pound.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Kenya

By Stacey Rosen

Economic and Agricultural Developments

Kenya gained independence in 1963. During the next decade, economic growth measured almost 7 percent annually in real terms, spurred by rapid expansion in the agricultural and manufacturing sectors. Agricultural growth was stimulated by the shift toward smallholder cultivation of high-potential land, the introduction of high-valued production activities, and the adoption of high-yielding corn varieties. Growth in the manufacturing sector can be attributed to larger domestic demand as incomes grew, protectionist policies, and the encouragement of foreign investment.

Kenya experienced an economic downturn in the middle to late 1970's that stemmed from both external and internal factors. The external factors included low international coffee prices, high oil prices, and a recession in industrialized countries. The internal factors included inappropriate trade and exchange rate policies that deteriorated the terms of trade, monopolistic government involvement in agricultural marketing that discouraged production, and a high population growth rate.

In response to these difficulties, the Kenyan Government shifted its economic policy in the early 1980's toward stabilization, with a focus on tighter fiscal and monetary management, more active exchange rate policy, and restrictions on imports. Real gross domestic product (GDP) growth in 1983 measured 3.7 percent, supported by growth in the agricultural sector. Agricultural output grew 4.5 percent, stimulated by good weather and improved producer prices. In 1984, Kenya experienced a devastating drought that cut agricultural output markedly and hurt the overall economy. Real economic growth measured only 1 percent. The agricultural sector recovered in 1985 with excellent harvests, and since then, growth in the sector has averaged 5 percent annually.

Kenya's real economic growth averaged more than 5 percent between 1985 and 1989, one of the best performances in Sub-Saharan Africa. Factors contributing to this growth include donor assistance, favorable weather, increased tourist revenues, and low oil prices. Economic growth could have been even greater, however, if the Government had implemented reforms of the agricultural marketing system more swiftly and had addressed the more difficult issues of government spending and the trade deficit.

The trade deficit, approximately $1 billion in 1990, has been fueled by soaring imports, which increased more than 10 percent per year between 1985 and 1990. Government imports were the source of the increase. Rising tourist revenues and donor assistance (this last bringing in about $1 billion per year) protected the economy from the higher import bill for a few years. However, by 1989, the balance-of-payments problem was evident. The Government has been forced in recent years to draw down reserves to very low levels to cover the import bill.

Since 1989, this failure to come to terms with issues such as government spending and the trade deficit has led to a slowing of economic growth. Also, the inflow of donor assistance has slowed, and Kenya has been faced with a more difficult external environment as coffee prices remain low and as oil prices have risen.

Population growth of 4.1 percent, maintained through the 1980's, is estimated to have slowed to 3.8 percent. Despite this achievement, population pressure remains a crucial problem for the provision of an adequate food supply, education, employment, and health services.

Policies in the 1980's

In late 1987, the Government adopted a major stabilization and structural adjustment program with the following objectives: (1) reducing the budget deficit, (2) controlling monetary expansion and reducing inflation, (3) maintaining an appropriate exchange rate that incorporates changes in domestic and international inflation, (4) limiting foreign borrowing, and (5) reducing the current account deficit and building up foreign exchange reserves.

Macroeconomic and Trade Policy Developments

A comprehensive financial sector adjustment program was initiated in 1989. The program was intended to increase reliance on market mechanisms to allocate financial resources and to implement monetary policy. The main tools used by the Central Bank for implementing monetary policy include setting cash and liquidity ratio requirements, credit ceilings, sales of treasury securities, and setting interest rates. The ratio requirements, however, have not been strictly enforced, and thus, many institutions are not meeting them. Also, the quantitative ceilings imposed on the growth of domestic credit in December 1987 have been violated. On the other hand, the commitment to maintaining positive real interest rates has been strong. Since 1988, interest rates

have become more market determined, and in 1991, they were deregulated (5, 10).[1]

The overwhelming problem in Kenya, however, is that monetary policy has been driven by fiscal policy. The Central Bank has limited autonomy to set monetary policy and therefore accommodates the borrowing requirements of the central Government. Central government borrowing has had more influence on the money supply in recent years than have other monetary policies. Government spending reached almost 40 percent of GDP in 1991. The rapid increase in government expenditure has resulted in an inflation rate of 25 percent. The increase in government spending, by increasing demand for imports, has also contributed to the deterioration in the balance of trade (4).

Also, monetary policies have focused on reform of the private sector with little emphasis on change in the parastatal sector. Parastatal expenditures are high, reaching nearly 20 percent of GDP. As a result, the effect of the slowdown in private sector borrowing was eroded by the growth of Central Bank borrowing from the banking system.

Kenya's trade policy is aimed at limiting imports in an effort to protect local industries and to conserve foreign exchange. Imports have been historically subject to licensing requirements. A move was made in 1988 toward import liberalization with the removal of quotas on raw materials, intermediate inputs, and bulk imports, such as fertilizer. The Government plans to liberalize trade of most of the items that remain restricted in the early 1990's, including luxury goods and those which compete with domestic production. Many of the quantitative import restrictions have been replaced by tariffs that allow firms to anticipate the cost of importing. Also, in February 1989, the import licensing system was modified to expedite the granting of licenses. As a result, the time between applying for an import license and the allocation of foreign exchange was shortened from more than 6 months to less than 1 month (5).

An export compensation scheme was introduced in 1975 to encourage nontraditional exports. Under this scheme, exports of manufactured goods with at least 30 percent domestic value added are eligible for compensation for duties paid on imported inputs. This scheme has been continually strengthened through more timely and reliable payments. Export processing zones were established in 1991 as another means to stimulate nontraditional exports (5).

To avoid overvaluation, to maintain competitiveness in domestic and external markets, and to improve the balance of payments, the Government maintains a flexible exchange rate that is adjusted continuously. The real effective exchange rate depreciated by 38 percent between 1982 and 1990. The shilling depreciated against the U.S. dollar by 47 percent (4).

Agricultural Policy Developments

Agriculture is the dominant sector of the Kenyan economy, accounting for nearly 30 percent of GDP, contributing 65 percent of export earnings, and employing 75 percent of the work force. Small-scale farmers account for three-quarters of agricultural production and over half of marketed output. Land is the greatest constraint to expanding agricultural production in Kenya. Less than 20 percent of the total land area of 57 million hectares is considered to have medium to high agricultural potential. Other than through land limitations, agricultural growth has been constrained by (1) inadequate incentives to producers, (2) limited input use, (3) insufficient availability of financing, and (4) declining efficiency of public expenditures (10).

The Government implemented the first phase of an agricultural sector reform program between 1986 and 1988. The goals of the program were to stimulate agricultural output and to contribute to fiscal stabilization. This program included increasing the supply of key inputs (especially fertilizer), improving the procedures for setting producer prices, reforming certain state enterprises, and improving extension services. Other proposals, which have not yet been fully adopted, include expanding agricultural credit, removing restrictions on interregional movement of corn, and reducing the role of the National Cereals and Produce Board (NCPB) to a buyer and seller of last resort (10).

Producer Pricing Policies

The Government's objective in formulating producer prices has been to provide incentives to farmers and to maintain some degree of price stability. To improve the efficiency of the pricing system, the Government has endorsed a system of annual price reviews for most agricultural commodities. The Ministry of Agriculture begins the process of reviewing prices in September, taking into account crop prospects, production costs, and general market conditions. For corn, import and export parity prices are calculated, and since Kenya is self-sufficient, the Government sets the producer price between the parity prices. For wheat and rice, the prices are based on the import parity price and production costs. World prices are derived from 5-year averages to prevent transmission of world market fluctuations to the domestic market. Price levels are then discussed with other government agencies and announced before the crop is planted (2, 6, 8).

The current cereal sector reform program, which has not been fully implemented, is aimed at restructuring the pricing system. The plan is to use the Government-set buying price as a floor price for farmers in surplus production years (or areas) and its selling price as a ceiling price. The Government will prevent large price fluctuations by maintaining and managing a strategic grain reserve. The reserve will also provide food security in the event of a major production shortfall (2).

The Government does not set producer prices for export crops such as coffee, tea, pineapple, sisal, or pyrethrum.

These prices are flexible and determined by sales at export auctions. Therefore, international supply and demand conditions play a principal role in determining these prices.

Marketing Policies

Since 1982, the Government has tried to improve the efficiency of the parastatal sector by encouraging private sector investment and by strengthening the performance of those parastatals that remain in the public sector. The policy framework included modification of the role of marketing boards, financial and organizational restructuring, and improvements in the boards' management capability.

The Government announced a long-awaited decision in late 1987 to reform the NCPB. The objectives of the reform were to turn the NCPB into a buyer and seller of last resort and to liberalize trade and pricing at the producer and miller levels. This reform was intended to end the NCPB's legal monopoly in corn marketing, to allow private traders and cooperatives to increase their market share, to write off NCPB's debt, and to ensure organizational restructuring of the NCPB (10).

As a result of the reforms, the NCPB's share of the primary market (purchases from farmers) fell from 30 percent of production in 1985/86 to 20 percent in 1989/90. NCPB's share in the secondary market (sales to millers) fell from 100 percent to 73 percent over the same period. The June 1992 goal for the NCPB share of the primary market to decline to 15 percent and the share of the secondary market to decline to 60 percent has not been achieved (8, 10).

Restrictions on interregional movement of corn have been reduced. The amount of corn that can be transported without a permit was raised from less than 1 ton to 4 tons in December 1990. This ceiling was expected to be raised further, but as of early 1993, has not been changed (8).

Input Policies

Because of Kenya's land constraints, increases in agricultural output will depend on improved yields. In turn, improved yields will result from increased use of inputs. After growing rapidly throughout the 1960's, fertilizer use slowed in the 1970's because of higher prices, low domestic producer prices, and a reduced fertilizer subsidy. Since 1985, fertilizer use has virtually stagnated. The overriding reason for the low level of fertilizer use is that smallholder producers, who account for almost 80 percent of agricultural output, use very little fertilizer or none at all because they lack a retail fertilizer network (1).

Recent policy reforms have aimed at increasing the availability and access to fertilizer (10). Beginning in 1986, the Government increased the number of fertilizer importers and distributors, allowed the large users to import directly, assured minimum allocations to established importers, and increased retail margins to encourage distribution to smallholders. During 1985-89, the number of major fertilizer distributors increased from 15 to 20. Small packages, 10-25 kilograms, were introduced for use on small farms.

Fertilizer price controls were eliminated in January 1990. This change represented a major shift from controlled prices that had been in effect since 1976. Contrary to the expected response, no increase has resulted in either fertilizer consumption or prices after the decontrol. This reaction can be attributed to declining demand from the coffee sector and to a decision by the Kenyan Grain Growers Cooperative Union (KGGCU) to discount prices to reduce excess stock levels and increase its market share. (KGGCU has a 45-percent share of the market.)

The decontrol of fertilizer prices has resulted in two notable developments, however. First, profit margins for all fertilizer distributors have been cut. Second, and most important for smallholders' access to fertilizer, interest in marketing fertilizer on the retail level has been renewed.

Consumer Policies

Retail prices of food increased substantially during the 1980's. For example, the average retail price of corn rose 240 percent (9). Higher costs associated with increased consumer food prices offset the gains associated with increased producer prices.

The Government sets and adjusts maximum consumer prices for such staples as wheat flour, cornmeal, vegetable oil, milk, bread, sugar, and tea, with the aim of reducing or eliminating subsidies. These prices have historically been maintained at levels affordable by the urban population (8).

Estimation of Policy Intervention in Agriculture

Producer and consumer subsidy equivalents (PSE's and CSE's) estimate the magnitude of the effects of measurable government policies in a given year and are used to evaluate the subsidies or taxes associated with government intervention. A positive PSE (CSE) means that the Government is subsidizing producers (consumers). A negative PSE (CSE) means that the government is taxing producers (consumers). In this report, when considering producers, the commodities evaluated include wheat, corn, rice, sugar, coffee, and tea. Coffee, tea, and corn contribute 80 percent of the value of Kenya's agricultural production. On the consumer side, only wheat, corn, and rice were evaluated. The PSE's and CSE's were calculated for the years 1982-89. The policies measured include pricing, the exchange rate, and fertilizer subsidies. Other areas of government intervention, such as transportation and credit, have been omitted because of lack of data.

Results for Producers

Although the pattern is not entirely clear, support for Kenyan producers seems to have grown on average during the study period (table 1). These producers were taxed in 1982-83 and again in 1988-89, but the level of taxation declined from an average of 26 percent to 8 percent of total revenue during

Table 1—Kenya: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Fertilizer subsidy	Mil. K Sh.	121	220	144	196	245	286	544	464
Price subsidy	Mil. K Sh.	-978	810	517	528	2,806	3,857	-971	-796
Foreign exchange	Mil. K Sh.	-4,651	-3,014	-1,145	737	-2,134	-3,177	-3,054	0
Policy transfers by commodity:									
Wheat	Mil. K Sh.	-136	-36	69	204	309	464	169	482
Corn	Mil. K Sh.	-2,585	-2,094	-311	634	1,952	1,144	-475	393
Rice	Mil. K Sh.	-68	-2	33	57	52	25	-29	-31
Sugar	Mil. K Sh.	-888	64	-43	552	570	431	458	-83
Coffee	Mil. K Sh.	-932	632	-742	-667	-2,099	-925	-2,591	69
Tea	Mil. K Sh.	-900	-548	511	680	132	-173	-1,013	-1,161
PSE by commodity:									
Wheat	Percent	-34	-8	27	31	43	66	20	46
Corn	Percent	-103	-68	-10	13	35	22	-7	6
Rice	Percent	-105	-2	36	57	48	24	-27	-25
Sugar	Percent	-154	8	-4	54	47	28	27	-4
Coffee	Percent	-39	14	-21	-15	-38	-20	-55	2
Tea	Percent	-48	-21	8	14	3	-4	-30	-25
Total policy transfers	Mil. K Sh.	-5,507	-1,985	-484	1,461	917	966	-3,481	-332
Value to producers	Mil. K Sh.	7,803	11,576	13,829	16,250	17,963	15,990	17,073	19,201
Total commodity PSE	Percent	-71	-17	-3	9	5	6	-20	-2

K Sh. = Kenyan shilling.
PSE = Producer subsidy equivalent.

each period. The farmers received subsidies for the 4-year period 1984-87, which averaged 16 percent of total revenue.

Rice and sugar producers received the most support in comparison with the value of their crops. However, these crops are too small to account for much of the total transfers. Coffee producers received on average little support. The strongest support in terms of total transfers went to corn producers.

Between 1982 and 1985, the Government's foreign exchange policy played the primary role in determining the level of producers' subsidies or taxes. In 1982-83, overvaluation of the shilling resulted in taxes to the producer. In 1984-85, the shilling was undervalued, and thus, producers were subsidized. From 1986 to 1989, the Government's pricing policy had, on average, the largest effect on producers' subsidies or taxes. As mentioned above, the Government has tried to set prices to provide incentives for increased production.

Results by Commodity

Wheat producers were subsidized from 1983 onward (table 2). The subsidies exhibited an increasing trend, averaged 67 percent of the producers' revenue, and peaked in 1989. The Government's pricing policy of fixing the producer price above the world price was the most important source of subsidization. Producer prices were raised even when world prices fell in 1986 and 1987.

After being taxed heavily in 1982-83, corn producers received subsidies averaging nearly a quarter of their revenue between 1984 and 1989 (fig. 1). The subsidies were highest

in 1986 and 1987 when world prices were very low. Between 1985 and 1986, the world price fell 25 percent, while the producer price increased 6 percent.

Rice is a minor crop in Kenya, but the producers are highly supported. Rice producers received subsidies during 1983-87 that averaged 68 percent of their revenue. Although the absolute value of these subsidies was low relative to the other crops evaluated, when measured against the low production levels for rice, such subsidies are significant. The Government's pricing policy was the principal contributor to the subsidies, and thus, producer prices were maintained at levels exceeding those of world prices.

Sugar producers received subsidies during 1983-88 that averaged about a third of producers' revenue. Pricing policies drove the subsidies as producer prices were continually raised even while world prices remained low. This price disparity was particularly evident in 1985, when world prices dropped to their lowest levels since the early 1970's, and Kenya's producer prices increased 8 percent.

Coffee producers were alternately taxed and subsidized throughout the study period. The level of support or tax was quite small, however, relative to producer revenue. The largest tax, which equaled nearly half of producer revenue, occurred in 1988 and derived from a large increase in the export price of Kenyan coffee and from an overvalued exchange rate. The largest subsidy equaled about a quarter of the value of the crop. This subsidy occurred in 1983 and came from an increase in producer prices, which was not matched by an increase in the world price.

Table 2—Kenya: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	225	205	95	240	245	220	245	235
Producer price	K Sh./ton	1,786	2,220	2,690	2,710	2,930	3,177	3,400	4,444
Value to producers	Mil. K Sh.	402	455	256	650	718	699	833	1,044
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	10	18	12	16	20	23	44	38
Price subsidy	Mil. K Sh.	66	74	77	160	358	524	246	444
Foreign exchange	Mil. K Sh.	-212	-127	-20	28	-69	-83	-121	0
Total policy transfers	Mil. K Sh.	-136	-36	69	204	309	464	169	482
PSE (per unit value)	Percent	-34	-8	27	31	43	66	20	46
PSE (per unit quantity)	K Sh./ton	-603	-173	722	850	1,260	2,107	691	2,051
	US$/ton	-55	-13	50	52	78	128	39	100
Corn:									
Level of production	1,000 tons	2,340	2,000	1,700	2,650	2,825	2,450	2,860	2,836
Producer price	K Sh./ton	1,077	1,539	1,750	1,870	1,980	2,090	2,250	2,450
Value to producers	Mil. K Sh.	2,520	3,078	2,975	4,956	5,594	5,121	6,435	6,948
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	25	46	30	41	51	60	114	98
Price subsidy	Mil. K Sh.	-665	-871	-17	324	2,534	2,168	621	296
Foreign exchange	Mil. K Sh.	-1,945	-1,269	-324	269	-633	-1,084	-1,211	0
Total policy transfers	Mil. K Sh.	-2,585	-2,094	-311	634	1,952	1,144	-475	393
PSE (per unit value)	Percent	-103	-68	-10	13	35	22	-7	6
PSE (per unit quantity)	K Sh./ton	-1,104	-1,047	-183	239	691	467	-166	139
	US$/ton	-101	-79	-13	15	43	28	-9	7
Rice:									
Level of production	1,000 tons	38	36	34	36	38	35	36	40
Producer price	K Sh./ton	1,700	2,700	2,700	2,800	2,900	3,000	3,000	3,100
Value to producers	Mil. K Sh.	65	97	92	101	110	105	108	124
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	3	5	3	4	5	6	12	10
Price subsidy	Mil. K Sh.	-11	29	40	48	63	49	-11	-41
Foreign exchange	Mil. K Sh.	-59	-36	-10	5	-16	-30	-30	0
Total policy transfers	Mil. K Sh.	-68	-2	33	57	52	25	-29	-31
PSE (per unit value)	Percent	-105	-2	36	57	48	24	-27	-25
PSE (per unit quantity)	K Sh./ton	-1,787	-64	970	1,596	1,380	714	-802	-781
	US$/ton	-164	-5	67	97	85	43	-45	-38
Sugar:									
Level of production	1,000 tons	308	326	372	346	366	413	412	441
Producer price	K Sh./ton	1,870	2,497	2,750	2,970	3,300	3,751	4,048	4,400
Value to producers	Mil. K Sh.	576	814	1,023	1,028	1,208	1,549	1,668	1,940
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	21	39	25	34	43	50	96	82
Price subsidy	Mil. K Sh.	-417	199	19	491	615	621	552	-165
Foreign exchange	Mil. K Sh.	-492	-174	-87	27	-88	-241	-190	0
Total policy transfers	Mil. K Sh.	-888	64	-43	552	570	431	458	-83
PSE (per unit value)	Percent	-154	8	-4	54	47	28	27	-4
PSE (per unit quantity)	K Sh./ton	-2,882	195	-115	1,596	1,559	1,044	1,113	-189
	US$/ton	-264	15	-8	97	96	63	63	-9
Coffee:									
Level of production	1,000 tons	86	130	90	115	109	126	105	104
Producer price	K Sh./ton	27,800	34,880	38,440	39,720	50,200	36,620	44,650	43,620
Value to producers	Mil. K Sh.	2,377	4,517	3,460	4,564	5,487	4,621	4,688	4,550
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	39	70	46	63	78	91	174	149
Price subsidy	Mil. K Sh.	90	1,340	-483	-954	-1,358	-12	-1,824	-80
Foreign exchange	Mil. K Sh.	-1,061	-778	-306	225	-819	-1,004	-941	0
Total policy transfers	Mil. K Sh.	-932	632	-742	-667	-2,099	-925	-2,591	69
PSE (per unit value)	Percent	-39	14	-21	-15	-38	-20	-55	2
PSE (per unit quantity)	K Sh./ton	-10,903	4,878	-8,248	-5,801	-19,203	-7,330	-24,675	658
	US$/ton	-1,000	367	-573	-354	-1,185	-444	-1,394	32

See footnotes at end of table.   Continued--

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Table 2–Kenya: Producer subsidy equivalents by commodity–Continued

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Tea:									
Level of production	1,000 tons	96	120	116	147	143	156	164	181
Producer price	K Sh./ton	19,410	21,840	51,840	33,660	33,820	25,000	20,370	25,440
Value to producers	Mil. K Sh.	1,863	2,614	6,024	4,951	4,846	3,895	3,341	4,594
Policy transfers to producers--									
Fertilizer subsidy	Mil. K Sh.	23	42	28	38	47	55	104	89
Price subsidy	Mil. K Sh.	-40	40	882	459	593	507	-555	-1,250
Foreign exchange	Mil. K Sh.	-883	-631	-398	183	-509	-734	-563	0
Total policy transfers	Mil. K Sh.	-900	-548	511	680	132	-173	-1,013	-1,161
PSE (per unit value)	Percent	-48	-21	8	14	3	-4	-30	-25
PSE (per unit quantity)	K Sh./ton	-9,370	-4,581	4,398	4,622	920	-1,108	-6,177	-6,429
	US$/ton	-860	-344	305	282	57	-67	-349	-312

K Sh. = Kenyan shilling.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Tea producers were taxed in 1982-83 and 1988-89 and subsidized in the intervening years. The subsidies averaged 16 percent of producers' revenue and mostly resulted from the producer price exceeding the export price of Kenyan tea. The taxes averaged 22 percent of the producers' revenue and were driven by both the foreign exchange policies and price differentials (domestic and world). In the early period, the overvalued shilling resulted in a tax to producers.

Figure 1

Kenya: Corn producer subsidy equivalent

Results by Policy

As mentioned above, the Government began to reduce fertilizer subsidies in the 1970's. Therefore, in the 1980's, such subsidies were so small that their effect on producers was negligible.

Kenya's pricing policy was an important source of subsidies for the producers between 1983 and 1987. At this time, world prices for many crops were stagnating or declining. However, in an effort to encourage production, the Government continued to raise producer prices.

Because Kenya has not followed the policy of highly overvaluing its currency as have many other African countries, the foreign exchange policy has not had an overwhelming effect on Kenyan producers. As expected, when the shilling was overvalued, the result was a tax to producers, and when the shilling was undervalued, the opposite was true.

Results for Consumers

The trend in consumer subsidies has moved in accordance with recent government policy (table 3). In 1982-83, subsidies averaged 56 percent of the cost of the crops. In 1988-89, subsidies averaged 16 percent of the cost of the crops.

Corn consumers received the largest subsidies, and these outweighed the taxes imposed on wheat and rice consumers throughout the period of this study. Corn is the staple of the Kenyan diet, contributing almost 50 percent of total caloric intake. For most years, the Government's pricing policy had a larger influence in determining subsidies or taxes than the foreign exchange policy. In addition, the domestic consumer price was lower than the world price, which resulted in subsidies (fig. 2).

Results by Commodity

Support for wheat consumption appears to be declining, since consumers who were heavily subsidized between 1982 and 1984 were taxed from 1985 to 1989 (except for 1988) (table 4). The subsidies in the early period averaged nearly 30 percent of the cost of the crop. The taxes averaged less than 10 percent.
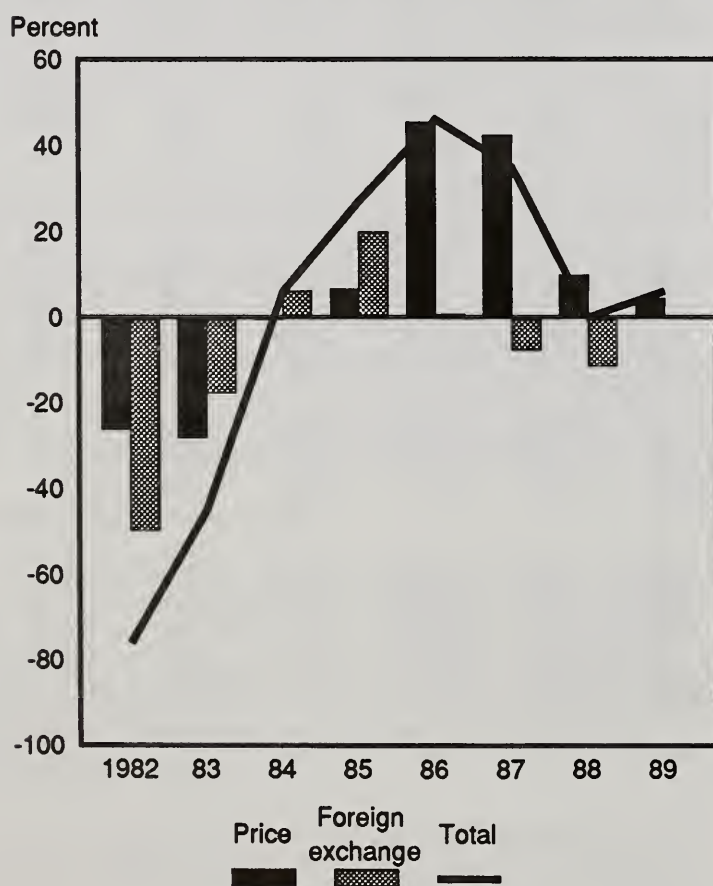
Table 3—Kenya: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. K Sh.	933	2,504	1,814	909	-456	-1,301	1,149	1,342
Foreign exchange subsidy	Mil. K Sh.	1,926	1,510	455	-214	576	1,116	1,208	0
Policy transfers by commodity:									
Wheat	Mil. K Sh.	375	494	344	42	-111	-434	280	-110
Corn	Mil. K Sh.	2,439	3,479	1,983	733	325	328	2,196	1,581
Rice	Mil. K Sh.	45	42	-57	-80	-95	-78	-119	-128
CSE by commodity:									
Wheat	Percent	47	49	26	4	-8	-27	17	-5
Corn	Percent	75	88	48	16	6	5	29	18
Rice	Percent	29	20	-20	-35	-33	-21	-23	-24
Total policy transfers	Mil. K Sh.	2,859	4,014	2,270	695	119	-185	2,357	1,342
Cost to consumers	Mil. K Sh.	4,223	5,144	5,743	5,905	7,236	8,615	9,729	11,403
Total commodity CSE	Percent	68	78	40	12	2	-2	24	12

K Sh. = Kenyan shilling.
CSE = Consumer subsidy equivalent.

Corn consumption was subsidized throughout the period studied with the exception of 1986 and 1987, when small taxes were imposed. The subsidies averaged 35 percent of the consumer price. The force behind these subsidies was mostly the Government's pricing policy. On average, the consumer price was 16 percent less than the border price.

Figure 2

Kenya: Corn consumer subsidy equivalent
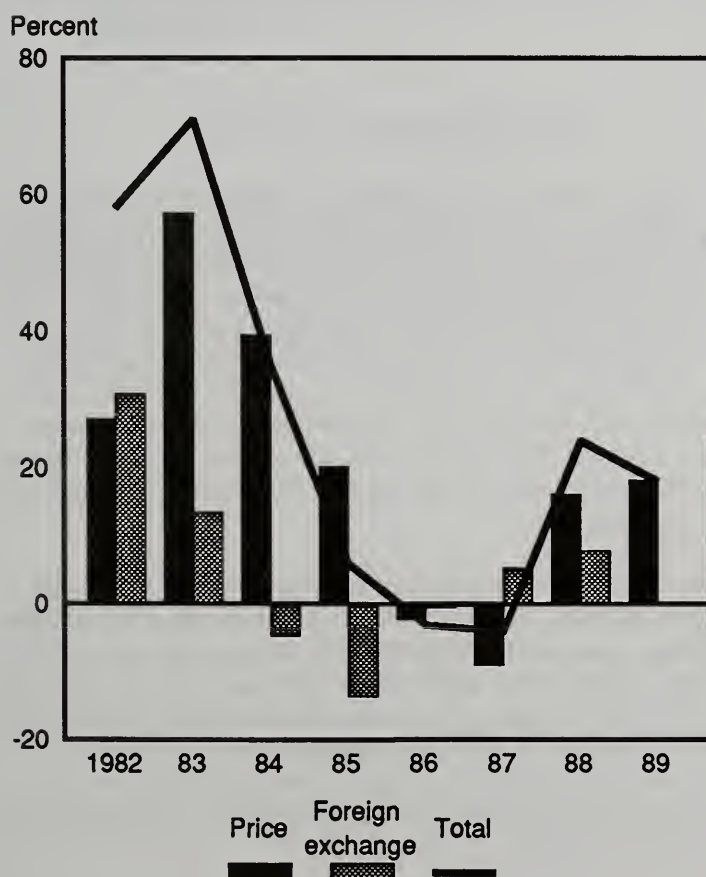
Corn subsidies have declined over the years, in accordance with government policy to reduce subsidies. In 1982-83, these subsidies averaged 65 percent of consumer prices, while in 1988-89, they fell to 21 percent.

Rice consumption has been taxed since 1984. The taxes, which averaged 31 percent of the consumer price, resulted from the Government's pricing policy. In the mid-1980's, the Government raised consumer prices while world prices were stagnating. Between 1984 and 1987, Kenya's consumer rice price increased 8 percent per year, while world rice prices increased less than 3 percent per year.

Results by Policy

The results of these evaluations indicate that the Government was committed to reducing consumer subsidies as consumer prices were raised, even while world prices were falling. Between 1983 and 1985, the subsidies were reduced, and in 1986-87, consumers were even taxed. The subsidies reappeared in 1988-89 but not because the Government lowered consumer prices. In fact, such prices were raised. However, world prices at this time were soaring.

Because the Kenyan shilling has not been highly undervalued or overvalued during the study period, the foreign exchange policy has had a limited effect on Kenyan consumers. During the years when the shilling was overvalued, the foreign exchange wedge was positive, indicating a subsidy to consumers. On the other hand, when the shilling was undervalued, the foreign exchange wedge was negative.

Conclusions

Kenyan producers benefitted on average from the shift in government policies through the 1980's, with the exception of 1988-89. In the early 1980's, the overvaluation of the shil-

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Table 4--Kenya: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	335	391	443	344	380	388	384	392
Wholesale price	K Sh./ton	2,385	2,550	2,930	3,430	3,800	4,200	4,200	5,500
Cost to consumers	Mil. K Sh.	799	997	1,298	1,180	1,444	1,630	1,613	2,156
Policy transfers to consumers--									
Price subsidy	Mil. K Sh.	60	251	251	82	-217	-581	91	-110
Foreign exchange	Mil. K Sh.	315	242	92	-40	107	147	189	0
Total policy transfers	Mil. K Sh.	375	494	344	42	-111	-434	280	-110
CSE (per unit value)	Percent	47	49	26	4	-8	-27	17	-5
CSE (per unit quantity)	K Sh./ton	1,119	1,262	776	122	-291	-1,119	729	-280
	US$/ton	103	95	54	7	-18	-68	41	-14
Corn:									
Level of consumption	1,000 tons	1,869	1,931	1,833	1,664	2,016	2,093	2,301	2,389
Wholesale price	K Sh./ton	1,749	2,039	2,269	2,702	2,730	3,163	3,302	3,644
Cost to consumers	Mil. K Sh.	3,269	3,937	4,159	4,496	5,504	6,620	7,598	8,706
Policy transfers to consumers--									
Price subsidy	Mil. K Sh.	886	2,254	1,633	902	-127	-598	1,221	1,581
Foreign exchange	Mil. K Sh.	1,553	1,225	349	-169	452	926	975	0
Total policy transfers	Mil. K Sh.	2,439	3,479	1,983	733	325	328	2,196	1,581
CSE (per unit value)	Percent	75	88	48	16	6	5	29	18
CSE (per unit quantity)	K Sh./ton	1,305	1,802	1,082	440	161	157	954	662
	US$/ton	120	135	75	27	10	9	54	32
Rice:									
Level of consumption	1,000 tons	37	43	48	34	40	50	54	55
Wholesale price	K Sh./ton	4,200	4,875	5,950	6,725	7,200	7,300	9,600	9,850
Cost to consumers	Mil. K Sh.	155	210	286	229	288	365	518	542
Policy transfers to consumers--									
Price subsidy	Mil. K Sh.	-13	-1	-70	-75	-112	-121	-163	-128
Foreign exchange	Mil. K Sh.	57	43	14	-5	17	43	44	0
Total policy transfers	Mil. K Sh.	45	42	-57	-80	-95	-78	-119	-128
CSE (per unit value)	Percent	29	20	-20	-35	-33	-21	-23	-24
CSE (per unit quantity)	K Sh./ton	1,213	969	-1,180	-2,346	-2,375	-1,562	-2,198	-2,335
	US$/ton	111	73	-82	-143	-147	-95	-124	-113

K Sh. = Kenyan shilling.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

ling, coupled with low producer prices relative to world prices, resulted in a tax to producers. As the shilling was devalued and producer prices rose above world prices between 1984 and 1987, producers were subsidized. In 1988-89, producers were taxed again, although not to the extent experienced in the earlier period. This taxing took place when the shilling became overvalued again and world prices recovered, in some cases exceeding producer prices.

Kenyan consumers were worse off as a result of the implementation of new policies. The combination of devaluing the shilling and raising consumer prices relative to world prices worked to reduce the consumer subsidies. In 1986-87, consumers even incurred a small tax.

The overall results which have emerged from evaluating producer and consumer subsidy equivalents concur with the goals of the Government's policy reform efforts. These goals aim to provide producers with appropriate incentives for expanding production and to reduce the subsidies provided to the consumers.

Kenya's commitment to reform has recently come under question by international financial institutions and donors, as the Government has promised further reform but implementation has been delayed. Government expenditures have been excessive, reaching almost 40 percent of GDP in 1991. The budget deficit of 6 percent of GDP far exceeds the International Monetary Fund target of 2.5 percent. The policy of a much decreased role of the marketing boards in agriculture has not been fully realized. Full liberalization of cereal marketing, which was to take place in December 1991, has been postponed.

As a result of these delays or failures to meet goals, donor dissatisfaction has grown, and financial assistance has fallen. These organizations want to send a message to the Government calling for an acceleration of the pace of reform. While the Kenyan economy will suffer if the necessary reforms are not shortly put in place, the current trend is unlikely to change within the next year. Upcoming elections, which must take place by mid-1993, preclude any possibility of an austerity program.

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Appendix: Methodology

PSE's were calculated for six crops in Kenya. Three were food crops (wheat, corn, and sugar) and three were cash crops (sugar, coffee, and tea). CSE's were calculated for the food crops only. The policies evaluated to measure the level of government intervention included pricing, foreign exchange, and fertilizer.

Pricing Policy

For PSE's, the transfers stemming from pricing policies were derived by comparing the domestic producer prices (plus marketing costs) with the reference prices (plus transportation costs). The reference prices for wheat and corn were the U.S. prices. The price for rice was the Thai 2nd grade, while that for sugar was the Caribbean price. For coffee and tea, Kenya's export unit values were used because of the differences in quality between Kenyan coffee and other coffee traded on the international market.

For CSE's, domestic wholesale prices were compared with reference prices. Marketing costs were added to the reference prices.

The estimated marketing costs for corn were 40 percent of the producer price. For the other commodities, these cases were estimated at 30 percent of the respective producer prices (2).

Exchange Rate Policy

An equilibrium exchange rate was calculated by multiplying the index of the real effective exchange rate and the 1989 official exchange rate (3). After several years of devaluation, the shilling was assumed to be at an equilibrium level in 1989. Overvaluation or undervaluation is defined as the percentage difference between the official and equilibrium exchange rates. This difference is multiplied by the volume of production (or consumption) and by the product price to determine exchange rate transfers.

Fertilizer Policy

The fertilizer subsidy was derived from the difference between the reference price and the domestic price for diammonium phosphate (DAP), which was then multiplied by the share of fertilizer applied to each crop (1, 7). DAP has become the preferred fertilizer for Kenyan producers.

Appendix table 1--Wheat: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1.000 ha.	119	120	105	118	139	158	151	154
B. Production	1.000 tons	225	205	95	240	245	220	245	235
C. Producer price	K Sh./ton	1.786	2.220	2.690	2.710	2.930	3.177	3.400	4.444
D. Producer value (B*C)/1.000	Mil. K Sh.	402	455	256	650	718	699	833	1.044
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price including marketing costs	K Sh./ton	2.322	2.886	3.497	3.523	3.809	4.130	4.420	5.777
b. Border price. U.S. gulf port plus transportation	US$/ton	186	190	187	174	145	106	193	189
c. Border price. U.S. gulf port plus transportation	K Sh./ton	2.028	2.527	2.690	2.855	2.349	1.749	3.416	3.887
d. Price support (1a-1c)*B/1.000	Mil. K Sh.	66	74	77	160	358	524	246	444
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price, equilibrium exchange rate	K Sh./ton	2.968	3.146	2.899	2.739	2.630	2.128	3.909	3.887
d. Foreign exchange subsidy (1c-2c)*B/1.000	Mil. K Sh.	-212	-127	-20	28	-69	-83	-121	0
3. Fertilizer transfers--									
a. DAP price	K Sh./ton	4.703	4.978	4.779	4.767	4.770	5.481	6.036	5.830
b. Kenya fertilizer price. DAP	K Sh./ton	3.800	3.800	3.900	4.000	3.620	4.200	4.000	3.600
c. Fertilizer distribution	1.000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1.000)*0.076 (7.6 percent of total use)	Mil. K Sh.	10	18	12	16	20	23	44	38
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. K Sh.	-136	-36	69	204	309	464	169	482
2. Producer subsidy equivalents (F1/D)*100	Percent	-34	-8	27	31	43	66	20	46
G. Consumption	1.000 tons	335	391	443	344	380	388	384	392
H. Wholesale price	K Sh./ton	2.385	2.550	2.930	3.430	3.800	4.200	4.200	5.500
I. Consumer cost (G*H)/1.000	Mil. K Sh.	799	997	1.298	1.180	1.444	1.630	1.613	2.156
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price. U.S. gulf port plus handling	K Sh./ton	2.564	3.193	3.497	3.668	3.228	2.702	4.436	5.220
b. Wholsale price	K Sh./ton	2.385	2.550	2.930	3.430	3.800	4.200	4.200	5.500
c. Price support (1a-1b)*G/1.000	Mil. K Sh.	60	251	251	82	-217	-581	91	-110
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price. equilibrium exchange rate	K Sh./ton	3.504	3.812	3.706	3.552	3.509	3.081	4.929	5.220
d. Foreign exchange subsidy (2c-1a)*G/1.000	Mil. K Sh.	315	242	92	-40	107	147	189	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. K Sh.	375	494	344	42	-111	-434	280	-110
2. Consumer subsidy equivalents (K1/I)*100	Percent	47	49	26	4	-8	-27	17	-5

ha. — Hectare.
K Sh. — Kenyan shilling.
US$ — U.S. dollar.
DAP — Diammonium phosphate.
PSE — Producer subsidy equivalent.

Appendix table 2--Corn: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	1,720	1,520	1,600	1,790	1,795	1,600	1,800	1,815
B. Production	1,000 tons	2,340	2,000	1,700	2,650	2,825	2,450	2,860	2,836
C. Producer price	K Sh./ton	1,077	1,539	1,750	1,870	1,980	2,090	2,250	2,450
D. Producer value (B*C)/1,000	Mil. K Sh.	2,520	3,078	2,975	4,956	5,594	5,121	6,435	6,948
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price including marketing costs	K Sh./ton	1,508	2,155	2,450	2,618	2,772	2,926	3,150	3,430
b. Border price, U.S. f.o.b. plus transportation	US$/ton	164	195	171	152	116	124	166	161
c. Border price, U.S. f.o.b. plus transportation	K Sh./ton	1,792	2,590	2,460	2,496	1,875	2,041	2,933	3,326
d. Price support (1a-1c)*B/1,000	Mil. K Sh.	-665	-871	-17	324	2,534	2,168	621	296
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price, equilibrium exchange rate	K Sh./ton	2,623	3,225	2,651	2,394	2,099	2,484	3,356	3,326
d. Foreign exchange subsidy (1c-2c)*B/1,000	Mil. K Sh.	-1,945	-1,269	-324	269	-633	-1,084	-1,211	0
3. Fertilizer transfers--									
a. DAP	K Sh./ton	4,703	4,978	4,779	4,767	4,770	5,481	6,036	5,830
b. Kenya fertilizer price, DAP	K Sh./ton	3,800	3,800	3,900	4,000	3,620	4,200	4,000	3,600
c. Fertilizer distribution	1,000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1,000)*0.197 (19.7 percent of total use)	Mil. K Sh.	25	46	30	41	51	60	114	98
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. K Sh.	-2,585	-2,094	-311	634	1,952	1,144	-475	393
2. Producer subsidy equivalents (F1/D)*100	Percent	-103	-68	-10	13	35	22	-7	6
G. Consumption	1,000 tons	1,869	1,931	1,833	1,664	2,016	2,093	2,301	2,389
H. Wholesale price	K Sh./ton	1,749	2,039	2,269	2,702	2,730	3,163	3,302	3,644
I. Consumer cost (G*H)/1,000	Mil. K Sh.	3,269	3,937	4,159	4,496	5,504	6,620	7,598	8,706
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, U.S. gulf port plus handling	K Sh./ton	2,223	3,206	3,160	3,244	2,667	2,877	3,833	4,306
b. Wholsale price	K Sh./ton	1,749	2,039	2,269	2,702	2,730	3,163	3,302	3,644
c. Price support (1a-1b)*G/1,000	Mil. K Sh.	886	2,254	1,633	902	-127	-598	1,221	1,581
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price, equilibrium exchange rate	K Sh./ton	3,054	3,841	3,351	3,142	2,891	3,320	4,256	4,306
d. Foreign exchange subsidy (2c-1a)*G/1,000	Mil. K Sh.	1,553	1,225	349	-169	452	926	975	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. K Sh.	2,439	3,479	1,983	733	325	328	2,196	1,581
2. Consumer subsidy equivalents (K1/I)*100	Percent	75	88	48	16	6	5	29	18

ha. – Hectare.
K Sh. – Kenyan shilling.
f.o.b. – Free on board.
US$ – U.S. dollar.
DAP – Diammonium phosphate.
PSE – Producer subsidy equivalent.

Appendix table 3--Rice: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	8	9	9	9	9	10	11	12
B. Production, paddy	1,000 tons	38	36	34	36	38	35	36	40
C. Producer price, paddy	K Sh./ton	1,700	2,700	2,700	2,800	2,900	3,000	3,000	3,100
D. Producer value (B*C)/1,000	Mil. K Sh.	65	97	92	101	110	105	108	124
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price, milled including marketing costs	K Sh./ton	3,047	4,840	4,840	5,019	5,198	5,378	5,378	5,557
b. Border price, Thai 2nd grade plus transportation	US$/ton	307	304	255	225	218	241	321	320
c. Border price, Thai 2nd grade plus transportation	K Sh./ton	3,349	4,044	3,676	3,689	3,533	3,977	5,682	6,585
d. Price support (1a-1c)*B/1,000	Mil. K Sh.	-11	29	40	48	63	49	-11	-41
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price, equilibrium exchange rate	K Sh./ton	4,903	5,034	3,960	3,539	3,955	4,838	6,502	6,585
d. Foreign exchange subsidy (1c-2c)*B/1,000	Mil. K Sh.	-59	-36	-10	5	-16	-30	-30	0
3. Fertilizer transfers--									
a. DAP	K Sh./ton	4,703	4,978	4,779	4,767	4,770	5,481	6,036	5,830
b. Kenya fertilizer price, DAP	K Sh./ton	3,800	3,800	3,900	4,000	3,620	4,200	4,000	3,600
c. Fertilizer distribution	1,000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1,000)*0.02 (2 percent of total use)	Mil. K Sh.	3	5	3	4	5	6	12	10
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. K Sh.	-68	-2	33	57	52	25	-29	-31
2. Producer subsidy equivalents (F1/D)*100	Percent	-105	-2	36	57	48	24	-27	-25
G. Consumption	1,000 tons	37	43	48	34	40	50	54	55
H. Wholesale price	K Sh./ton	4,200	4,875	5,950	6,725	7,200	7,300	9,600	9,850
I. Consumer cost (G*H)/1,000	Mil. K Sh.	155	210	286	229	288	365	518	542
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, Thai 2nd grade plus handling	K Sh./ton	3,859	4,854	4,486	4,529	4,403	4,877	6,582	7,515
b. Wholesale price	K Sh./ton	4,200	4,875	5,950	6,725	7,200	7,300	9,600	9,850
c. Price support (1a-1b)*G/1,000	Mil. K Sh.	-13	-1	-70	-75	-112	-121	-163	-128
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Border price, equilibrium exchange rate	K Sh./ton	5,413	5,844	4,770	4,379	4,825	5,738	7,402	7,515
d. Foreign exchange subsidy (2c-1a)*G/1,000	Mil. K Sh.	57	43	14	-5	17	43	44	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. K Sh.	45	42	-57	-80	-95	-78	-119	-128
2. Consumer subsidy equivalents (K1/I)*100	Percent	29	20	-20	-35	-33	-21	-23	-24

ha. -- Hectare.
K Sh. -- Kenyan shilling.
US$ -- U.S. dollar.
DAP -- Diammonium phosphate.
PSE -- Producer subsidy equivalent.

Appendix table 4—Sugar: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	30	31	35	40	52	52	50	43
B. Production, raw	1,000 tons	308	326	372	346	366	413	412	441
C. Producer price, raw	K Sh./ton	1,870	2,497	2,750	2,970	3,300	3,751	4,048	4,400
D. Producer value (B*C)/1,000	Mil. K Sh.	576	814	1,023	1,028	1,208	1,549	1,668	1,940
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price including marketing costs	K Sh./ton	2,091	2,792	3,075	3,321	3,690	4,194	4,526	4,920
b. Border price, Caribbean plus transportation	US$/ton	316	164	210	116	124	163	180	257
c. Border price, Caribbean plus transportation	K Sh./ton	3,444	2,181	3,024	1,902	2,009	2,690	3,186	5,294
d. Price support (1a-1c)*B/1,000	Mil. K Sh.	-417	199	19	491	615	621	552	-165
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Percent overvaluation	Percent	46	24	8	-4	12	22	14	0
d. Border price, equilibrium exchange rate	K Sh./ton	5,042	2,715	3,258	1,825	2,249	3,272	3,646	5,294
e. Foreign exchange subsidy (1c-2d)*B/1,000	Mil. K Sh.	-492	-174	-87	27	-88	-241	-190	0
3. Fertilizer transfers--									
a. DAP	K Sh./ton	4,703	4,978	4,779	4,767	4,770	5,481	6,036	5,830
b. Tanzania fertilizer price, DAP	K Sh./ton	3,800	3,800	3,900	4,000	3,620	4,200	4,000	3,600
c. Fertilizer distribution	1,000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1,000)*0.165 (16.5 percent of total use)	Mil. K Sh.	21	39	25	34	43	50	96	82
F. Total transfers to producers:									
1. Total (1d+2e+3d)	Mil. K Sh.	-888	64	-43	552	570	431	458	-83
2. Producer subsidy equivalents (F1/D)*100	Percent	-154	8	-4	54	47	28	27	-4

ha. — Hectare.
K Sh. — Kenyan shilling.
US$ — U.S. dollar.
DAP — Diammonium phosphate.
PSE — Producer subsidy equivalent.

Appendix table 5--Coffee: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	132	135	135	138	144	151	154	156
B. Production	1,000 tons	86	130	90	115	109	126	105	104
C. Producer price	K Sh./ton	27,800	34,880	38,440	39,720	50,200	36,620	44,650	43,620
D. Producer value (B*C)/1,000	Mil. K Sh.	2,377	4,517	3,460	4,564	5,487	4,621	4,688	4,550
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	K Sh./ton	27,800	34,880	38,440	39,720	50,200	36,620	44,650	43,620
b. Border price, export unit value	US$/ton	2,454	1,845	3,042	2,928	3,866	2,225	3,504	2,155
c. Border price, export unit value	K Sh./ton	26,750	24,535	43,806	48,021	62,629	36,717	62,025	44,386
d. Price support (1a-1c)*B/1,000	Mil. K Sh.	90	1,340	-483	-954	-1,358	-12	-1,824	-80
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Percent overvaluation	Percent	46	24	8	-4	12	22	14	0
d. Border price, equilibrium exchange rate	K Sh./ton	39,156	30,545	47,201	46,066	70,119	44,674	70,983	44,386
e. Foreign exchange subsidy (1c-2d)*B/1,000	Mil. K Sh.	-1,061	-778	-306	225	-819	-1,004	-941	0
3. Fertilizer transfers--									
a. DAP	K Sh./ton	4,703	4,978	4,779	4,767	4,770	5,481	6,036	5,830
b. Kenya fertilizer price, DAP	K Sh./ton	3,800	3,800	3,900	4,000	3,620	4,200	4,000	3,600
c. Fertilizer distribution	1,000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1,000)*0.30 (30 percent of total use)	Mil. K Sh.	39	70	46	63	78	91	174	149
F. Total transfers to producers:									
1. Total (1d+2e+3d)	Mil. K Sh.	-932	632	-742	-667	-2,099	-925	-2,591	69
2. Producer subsidy equivalents (F1/D)*100	Percent	-39	14	-21	-15	-38	-20	-55	2

ha. = Hectare.
K Sh. = Kenyan shilling.
US$ = U.S. dollar.
DAP = Diammonium phosphate.
PSE = Producer subsidy equivalent.

Appendix table 6—Tea: Calculation of Kenya's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	81	82	83	84	86	87	88	90
B. Production	1,000 tons	96	120	116	147	143	156	164	181
C. Producer price	K Sh./ton	19,410	21,840	51,840	33,660	33,820	25,000	30,370	25,440
D. Producer value (B*C)/1,000	Mil. K Sh.	1,863	2,614	6,024	4,951	4,846	3,895	4,981	4,594
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	K Sh./ton	19,410	21,840	51,840	33,660	33,820	25,000	20,370	25,440
b. Border price, export unit value	US$/ton	1,819	1,617	3,073	1,862	1,832	1,318	1,342	1,571
c. Border price, export unit value	K Sh./ton	19,827	21,506	44,251	30,537	29,678	21,747	23,753	32,363
d. Price support (1a-1c)*B/1,000	Mil. K Sh.	-40	40	882	459	593	507	-555	-1,250
2. Foreign exchange policy--									
a. Official exchange rate	K Sh./US$	11	13	14	16	16	17	18	21
b. Equilibrium exchange rate	K Sh./US$	16	17	16	16	18	20	20	21
c. Percent overvaluation	Percent	46	24	8	-4	12	22	14	0
d. Border price, equilibrium exchange rate	K Sh./ton	29,022	26,774	47,680	29,294	33,228	26,460	27,184	32,363
e. Foreign exchange subsidy (1c-2d)*B/1,000	Mil. K Sh.	-883	-631	-398	183	-509	-734	-563	0
3. Fertilizer transfers--									
a. DAP	K Sh./ton	4,703	4,978	4,779	4,767	4,770	5,481	6,036	5,830
b. Kenya fertilizer price, DAP	K Sh./ton	3,800	3,800	3,900	4,000	3,620	4,200	4,000	3,600
c. Fertilizer distribution	1,000 tons	143	199	175	272	227	238	285	222
d. Fertilizer PSE ((3a-3b)*3c/1,000)*0.18	Mil. K Sh.	23	42	28	38	47	55	104	89
(18 percent of total use)									
F. Total transfers to producers:									
1. Total (1d+2e+3d)	Mil. K Sh.	-900	-548	511	680	132	-173	-1,013	-1,161
2. Producer subsidy equivalents (F1/D)*100	Percent	-48	-21	8	14	3	-4	-20	-25

ha. = Hectare.
K Sh. = Kenyan shilling.
US$ = U.S. dollar.
DAP = Diammonium phosphate.
PSE = Producer subsidy equivalent.

Morocco

By Mark D. Wenner

Economic and Agricultural Developments

Since 1985, Morocco has pursued unilateral agricultural liberalization with the technical assistance and financial support of various international donors. Since that time, the Government has succeeded in freeing certain producer markets, reducing some input subsidies, and better targeting consumer food subsidies. These reforms, intended to encourage more efficient and profitable patterns of production as well as to reduce budgetary pressures, have been largely successful, but challenges and bottlenecks remain. Accelerated agricultural and food reforms threaten to heighten social tensions. For this reason, the choice of least-cost intervention that could stabilize selected prices and minimize risk is a high priority on the policy agenda.

From the end of French protectorate in 1956 until the debt crisis of the early 1980's, Morocco pursued increasing domestic production of manufactured goods, favored irrigated over dryland agriculture, and relied heavily on direct state intervention in markets to achieve desired ends. Natural resource endowments, agrarian structure, and government policies continue to shape production and trade patterns, despite the change in orientation toward export-led development and freer markets in recent years.

The country's principal natural resources are phosphate rock deposits, the largest in the world, and marine fisheries lying off a 2,300-mile coastline. The mining of phosphate and the processing of chemical derivatives constitute the most dynamic subsector in the economy and the chief source of export earnings (43 percent) (7).[1] Rich fisheries lie off the coast, but catches have been considerably below estimated sustainable yields because of the small size of the national deep sea trawler fleet (6). Arable land, on the other hand, is scarce, with only 18 percent (7.5 million hectares) of total land mass suitable for agriculture (22). Rainfall variability and a dualistic agrarian structure also combine to further constrain crop production.

The principal annual crops are wheat, barley, sugar beet, and beans, covering 80 percent of the cultivated area. The main perennial crops are citrus fruits, olives, dates, and grapes, occupying 18 percent of cultivated area. The Government has invested heavily in irrigation because water is the most important constraint on agricultural production. The area irrigated has thus increased from 65,000 hectares in 1967 to 1.2 million hectares in 1989 (21).

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

Farm structure is also an important factor is assessing Moroccan agricultural performance and potential supply. Farms tend to be either large, consolidated, irrigated, and reliant on the use of purchased chemical inputs or small, fragmented, rainfed, and less reliant on the purchase of modern inputs (18). These generalized differences result in sharp differences in productivity, degree of commercialization, value added, and access to capital and extension services. Small traditional, dryland farmers, although constituting the vast majority of producers, tend to lag behind larger farmers in most performance categories and in access to capital, government subsidies, and transportation.

Agriculture, when employment, share of gross domestic product (GDP), and export earnings are jointly considered, is still the most important sector of the economy. In 1988, agriculture contributed 17 percent to GDP compared with 34 percent for manufacturing but directly employed 39 percent of the labor force, which is considerably more than is the case with industry (6). Also, agriculture generated 25 percent of export earnings. Fifty-seven percent of the population is rural based and depends on agricultural activities either directly or indirectly for sustenance.

The Moroccan economy achieved acceptable rates of macroeconomic growth in the 1960's. It experienced an export boom due to high international phosphate rock prices in the mid-1970's and then entered a period of decline and financial disequilibrium. By 1980, total external debt had risen to $7 billion, up from $1.7 billion in 1976, partly because of military losses from a campaign to reclaim the western Sahara (35). Large subsidies to public enterprises, food consumers, and agricultural producers contributed to widening public deficits. Foreign borrowing and domestic money expansion permitted private consumption to continue growing. When several external shocks came in rapid succession—the collapse of phosphate prices, the oil crisis of 1979, rising international interest rates, and two droughts—debt servicing became untenable, and debt rescheduling was requested and granted in 1983.

Policies in the 1980's

The crisis in balance of payments in the early 1980's forced policymakers to rethink patterns of government intervention. Economic stabilization and liberalization began with the disbursement of a series of World Bank sectoral structural adjustment loans, starting in 1984.

Macroeconomic and Trade Policy Developments

The chief objective of the reform program was to restore balance to the external accounts (33). In pursuit of this goal, the Government significantly changed the trade regime, exchange rate system, financial institutions, and agricultural and industrial sectors. Some of the main reforms and their results are discussed below.

Moroccan authorities generally devalued the dirham in nominal terms to cut import demand and to enhance export competitiveness.[2] The volume of Morocco's exports increased at an average annual rate of 10 percent in the reform period compared with an annual average growth in Morocco's export markets of 7 percent. This positive response to trade liberalization, along with favorable developments in international energy and wheat prices, helped to relax the foreign exchange constraint (5).

Financial sector reforms, such as higher interest rates on deposit accounts and convertibility of foreign worker accounts, has helped attract more worker remittances, bolstering the capital account (6, 7).

While the GDP growth rate and external accounts deficits fluctuated, government finance and real effective exchange rates showed more consistent improvement. The 1989 budget deficit fell to 6 percent of GDP from a high of 14 percent in 1981 (6). The annual average inflation rate also fell from a high of 12.6 in 1985 to 3.1 percent in 1989 (6). Also, the real effective exchange rate index fell from 100 in the 1980 base year to 67.3 in 1989 (6).

As a result of these reforms and of new loans, debt relief, and growing export values for phosphates and oranges, overall economic performance generally improved in the late 1980's. GDP at constant prices grew at 10.3 percent in 1988 but faltered in 1989 to 1.3 percent, recovering slightly in 1990 to 3.4 percent (6). The current account balance showed its first surplus in 1988 after a decade of deficits (35). However, in 1989, the balance deteriorated dramatically, recovering slightly in 1990 (34). Serious challenges to the Moroccan economy linger. The country has a $20 billion external debt and large debt service, and internal criticism is growing concerning the consequences of income distribution under the austerity measures (34).

Agricultural Policy Developments

The Government's stated goals are to increase agricultural productivity, attain self-sufficiency in sugar production, and promote agricultural exports (33). The primary goal, as indicated by the consistently higher budgetary outlays for food subsidies compared with operational subsidies for public enterprises that assist producers, has been to guarantee low food prices.

Since 1985, the Government has substantially increased producer prices, cut input and service subsidies except for credit, and completely liberalized corn and barley markets. More changes are expected in coming years, especially changes related to international trade, domestic procurement, and the marketing of soft wheat and sugar.

Producer Pricing Polices

Each year the Interministerial Pricing Committee, which comprises representatives from the Ministry of Agriculture and Agrarian Reform (MARA), the Ministry of Trade and Industry (MCI), the Ministry of Finance, the Ministry of Interior, and the Prime Minister's Office, sets producer prices for selected commodities on a cost-plus basis (19).

Marketing Policies

The National Cereals and Pulse Office (Office National Interprofessional des Céreales et Legumineuses, ONICL) is the government monopoly responsible for grain imports and marketing. ONICL is charged with defending the guaranteed price for soft wheat and, until 1988/89, the minimum price for hard wheat and barley set by the Interministerial Pricing Committee.[3] Also, ONICL licenses and distributes all imported grains to mills, directing the National Transportation Office (Office National des Transports, ONT) to move authorized allotments of grains from point of entry to authorized mills for a reimbursable fee. Licensed traders sell the imported grain to the mills at a subsidized price, and ONICL reimburses them the difference between the imported price and the subsidized price plus maintenance costs and a fixed profit margin. When world prices are lower than the support price, traders reimburse ONICL the difference between the two prices minus transportation and maintenance costs (10, 19).

Millers similarly sell soft wheat flour to wholesalers and bakeries at a fixed transfer price and receive from ONICL the difference between the subsidized transfer price (trader-miller) and miller-baker plus milling costs and a fixed profit margin. The wholesalers and bakeries then sell the flour at fixed prices to retail stores, who then sell to consumers at an official consumer price (9).

When the border price of imported grain is higher than the state trading price of grain, ONICL uses its reserves or seeks relief from the Stabilization Fund (Caisse de Compensation, CC). The CC is an agency responsible for distributing consumption subsidies to various other parastatals and private businesses responsible for the production and distribution of wheat flour and sugar.

Anomalies exist in the marketing chain and sometimes lead to illegal transactions. The licensed traders and millers receive government compensation for their processing costs, whereas wholesalers, bakeries, and retailers do not. This differential treatment, combined with the free market price of

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[2]Overvaluation persists in real terms, however. The percentage of overvaluation as measured by the equilibrium exchange rate in this analysis moved downward sharply in 1989.

[3]Soft wheat is used exclusively for making bread flour for lower class urban consumers, while hard wheat is largely consumed in rural areas and by the middle and upper classes in urban areas.

soft wheat that is typically 20-40 percent below the support price, permits the existence of a parallel market. The price difference arises because many farmers cannot transport their grain to government collection points, and millers are prohibited from buying directly from producers. Also, because of its small budgets, ONICL sometimes cannot defend support prices throughout the harvest season. Licensed traders are tempted to collect monopoly rents by buying soft wheat directly from farmers at a low price but claim they bought it at the higher support price. In bad harvest years, enforcement becomes problematic, since wholesalers and retailers then sell flour above the official rates and claim that government prices do not cover maintenance and profit margins as such prices do for millers and licensed traders (10). The National Tea and Sugar Office (Office National du Thé et du Sucre, ONTS) plays a role for sugar similar to that of the ONICL. ONTS determines the level of sugar imports and uses variable levies to control the price of imported sugar. Raw sugar is sold to refiners at a fixed price set by the Stabilization Fund to cover production costs, a margin for return to capital, and a consumption excise tax. The sugar refineries then sell granulated sugar to wholesalers at a fixed price and are compensated for the difference between the government-decreed "transfer" price and the wholesale price. Retailers then sell to consumers at fixed consumer prices (19).

The marketing and distribution of the other intervened commodities, edible oils and cotton, are roughly similar to soft wheat and sugar. The sugar, cotton, and edible oil markets are less prone to black market activities because many processing plants are government owned and operated. Government consumer pricing for sugar and edible oils is also better controlled because the population is concentrated in a few urban centers, which facilitates monitoring, and because supplies fluctuate less sharply.

Input Policies

The Ministry of Agriculture and Agrarian Reform (MARA) and other government agencies subsidize seed, irrigation water, fertilizer, credit, equipment rental, and research and extension services. MARA is responsible for extension services mostly in dryland areas, while nine Regional Agricultural Development Offices (Offices Régionaux de la Mise en Valeur Agricole, ORMVA) are responsible for the technical and agronomic management of large-scale irrigation projects. ORMVA determines crop rotation patterns, maintains water works, distributes seed and fertilizer, and provides extension services to farmers within the project perimeter (33).

A fertilizer agency (FERTIMA) monopolizes the import and sale of fertilizer and reimburses fertilizer producers for the difference between the actual manufacturing costs and the administratively set reference prices. All margins for transport, handling, blending, bagging, storage, and distribution are also fixed (19). The national seed company (SONACOS) stabilizes the price and supply of selected seeds. However, the seed subsidy never amounts to a large budgetary outlay, and the affected area is small. The Export Office (Office de Commercialisation et d'Exportation, OCE) monopolized the ex-

port of cash crops, mostly citrus fruits, potatoes, tomatoes, and cut flowers, and generated revenue through surcharges until it was abolished in 1986 (19).

The National Agricultural Credit Bank (Caisse Nationale de Crédit Agricole, CNCA) is a specialized credit institution that disburses low-interest loans to farmers and cooperatives (19). Agricultural loan interest rates are lower than commercial rates (6).

Consumer Policies

The policy of providing cheap food was implemented by state trading control to reduce consumer price fluctuations and input subsidies to lower the cost of production. Output pricing policies may increase supply, but if infrastructure is poor and marketing costs high, as is typical in most developing countries, such a policy could unnecessarily increase consumer prices. The dietary staples include wheat flour, sugar, barley, and vegetable oils. These foods account for 42 percent, 11 percent, 9 percent, and 8 percent, or together 70 percent of daily per capita caloric intake (21). Consumer prices for flour, bread, refined sugar, vegetable oils, and dairy products are set by the Government but are set on a more irregular basis than the producer prices (19).

Estimation of Policy Intervention in Agriculture

The transfer effects of government policies affecting Moroccan producers and consumers of eight commodities were quantified using producer and consumer subsidy equivalents (PSE's and CSE's). PSE's were calculated for wheat, barley, corn, cotton lint, and raw sugar, and CSE's for wheat flour, refined sugar, and edible vegetable oils. These measures help illuminate the effect of the changes in incentives mandated in the structural adjustment program.

The cereals are produced by both the commercial and the small farmer sector and constitute the major field crops. Sugar, very important in the diet, is an import substitute. Cotton is a minor crop but an important input into the burgeoning local textile industry. These commodities constitute more than 60 percent of value added in agriculture. Livestock and high-valued export crops, such as citrus fruits, tomatoes, grapes, dates, potatoes, fish, and shellfish, were not included in this study because of insufficient data. The foodstuffs covered account for most of the caloric intake.

Measured producer policies include marketing board activities (which combine both the effects of price supports and state trading restrictions on imports), input subsidies, transportation assistance on imported grain, irrigation water, capital subsidies, and currency overvaluation. Some policies to augment input use, unmeasured here for lack of sufficiently disaggregated data, include infrastructure, seed, extension service, and electricity. Also, the implicit subsidies and transfers from other sectors involving marketing taxes, credit defaults, and tax exemptions for agricultural income were not

captured by the study. Consumer policies measured here include the effect of price controls and an overvalued currency.

The PSE's and CSE's, which are aggregate measures, mask the income distribution effects of intervention. For example, distribution of subsidies shows striking inequalities. Irrigated farms receive an estimated 70-percent share of input subsidies (17). This disparity reflects the Government's commitment to spur the development of modern agriculture in nine high-potential, large-scale irrigated areas.

Results for Producers

Between 1982 and 1989, the Moroccan Government reduced support to its agricultural producers from a modest level at the beginning of the period to a negative level at the end (table 1). In 1987-89, the taxes to producers averaged 8 percent of the value of production. Wheat, corn, and cotton producers were generally supported but at a decreasing rate. The peak support in 1985-86 coincided with the start of the World Bank's mandated reform program. The policies most influential in determining levels of support or taxation were the marketing board and foreign exchange.

Results by Commodity

Over the period 1982-89, wheat producers were alternately taxed or subsidized (fig. 1 and table 2). The taxes peaked at nearly 8 percent, while the subsidies peaked at more than 12 percent. In 1988 and 1989, when hard wheat was liberalized, the level of support dropped substantially. From the perspective of policymakers, soft or bread wheat is the most strategic grain. While soft wheat on average accounts for 45

percent of total wheat production, it accounted for 90 percent of ONICL wheat purchases during 1982-87 and 100 percent for 1988-89. Thus, soft wheat producers continue to benefit from rising official prices and irrigation and credit subsidies. Imported grain transport assistance, an overvalued exchange rate, and cuts in fertilizer subsidies, however, offset such supports.

Sugar was taxed throughout the study period except for 1984 and 1985, when a massive drop in the international reference price and currency devaluation yielded positive support. Over the entire period, the average tax was 115 percent of producer value.

Since 1963, the Government has focused on sugar for an import substitution program, thus protecting the local industry through import quotas and variable levies and channeling substantial subsidies towards the sugar industry. The PSE's can be examined without the currency overvaluation tax to assess the effect of domestic pricing policy. Since sugar is not exported, no direct producer effect appears in the taxation caused by currency overvaluation. The only producer effects are indirect ones on choice of technique, arising from the relative prices of imported versus locally produced inputs.

Thus, if indirect effects are considered minor and the overvaluation effect were removed, sugar would emerge as a supported commodity with an adjusted average annual PSE of 30 percent. The only year of nonsupport, as measured by the adjusted PSE, was 1983 and was caused by a higher than average international reference price. Most of the adjusted PSE

Table 1--Morocco: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Marketing board subsidy	Mil. DH	457	166	149	448	1,799	1,036	1,026	992
Fertilizer subsidy	Mil. DH	139	-15	322	199	-70	-209	-95	-325
Credit subsidy	Mil. DH	36	23	18	38	85	74	73	76
Foreign exchange subsidy	Mil. DH	-651	-720	-419	252	-1,101	-1,095	-2,515	-2,312
Irrigation subsidies	Mil. DH	132	133	156	140	168	149	169	179
Import transport subsidy	Mil. DH	-27	-22	-21	-24	-69	-41	-81	-83
Policy transfers by commodity:									
Wheat	Mil. DH	80	-212	176	532	405	-45	-524	-643
Corn	Mil. DH	11	-4	51	95	87	34	-97	-52
Barley	Mil. DH	1	-125	-76	264	235	-56	-630	-613
Cotton	Mil. DH	31	7	30	85	105	73	86	65
Sugar	Mil. DH	-37	-100	23	76	-21	-92	-259	-231
PSE by commodity:									
Wheat	Percent	3	-8	6	13	5	-1	-7	-7
Corn	Percent	4	-1	12	16	16	8	-20	-15
Barley	Percent	0	-11	-4	9	5	-2	-23	-18
Cotton	Percent	44	7	46	59	67	34	49	35
Sugar	Percent	-66	-147	31	90	-24	-86	-192	-175
Total policy transfers	Mil. DH	86	-434	204	1,052	812	-86	-1,424	-1,474
Value to producers	Mil. DH	6,735	4,396	5,345	7,970	13,525	8,648	11,578	12,632
Total commodity PSE	Percent	1	-10	4	13	6	-1	-12	-12

DH = Dirham.
PSE = Producer subsidy equivalent.

support stemmed from the large gap between local prices and the world reference prices.[4] The internal support decreased from a high of 46 percent in 1984 to 32 percent in 1989 as the wedge between official producer prices and the weighted farmgate border equivalent price narrowed.

Before 1988, corn was supported at an average annual PSE of 11 percent. The main support instruments were irrigation subsidies and marketing board intervention. Corn is a minor crop and represents only 2 percent of total agricultural value.

Barley is the most widely grown crop in Morocco because of its resistance to drought. Despite official support prices, very little barley was marketed through government channels. Most barley is consumed onfarm, being used for food for both humans and animals. Barley producers were taxed in most years of the study in a range of 2 to 23 percent of producer revenue. If exchange rate overvaluation were excluded, the average annual subsidy for the 1982-89 period would be 4 percent.

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[4]Most world sugar is traded under quota systems. The Caribbean price quote and the one used here is the residual market price for production in excess of quota allowances. This price is the most market-demanded price, but it is still probably lower than would be expected in a complete market. Econometrically modeled sugar prices would be the ideal reference price.

Figure 1
Morocco: Wheat producer subsidy equivalent

Percent

Marketing board · Foreign exchange · Total
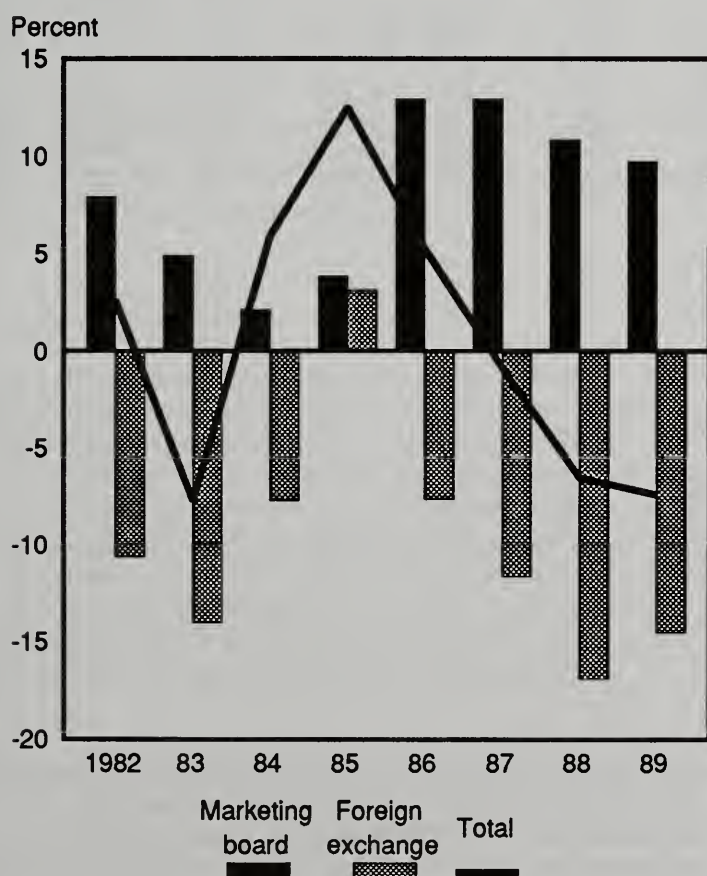
Cotton lint production in Morocco is low compared with other African producers. Yet, the Government consistently supported cotton with an average annual PSE of 42 percent. Most of the support was provided through marketing board intervention.

Results by Policy

The negative levels of support over the study period can be explained by movements in exchange rates, international reference prices, and policy reform. The level of support significantly declined in 1983 from the level of the previous year because implicit taxes associated with an overvalued exchange rate and sharp movements in international reference prices overwhelmed the positive transfers of the marketing board and credit subsidies. Poor rainfall in 1983 resulted in a 10-percent drop in wheat production and a 47-percent decline in barley output. These declines, combined with a high international sugar reference price, lowered the marketing board transfers by 64 percent from those of the previous year. The removal of price supports for corn and barley in 1988 and 1989 allowed the negative effects of currency overvaluation and fertilizer price liberalization to significantly increase the aggregate tax level.

Positive policy transfers peaked in 1985-86 and then declined dramatically by 1989 as economic reforms accelerated. Marketing board support fell 45 percent and credit subsidies declined 11 percent between 1986 and 1989. Fertilizer subsidies became consistently negative after 1986. Sharper rises in local prices for nitrogen-based fertilizer compared with the reference price (146 percent compared with 21 percent over the study period) explain the pattern. This development is consistent with the conditions of the World Bank's Agricultural Structural Adjustment Loans of 1985 and 1987.

The two taxing policies, exchange rate overvaluation and import transport assistance, increased in value during the study period. Overvaluation taxed producers 255 percent more in 1989 than in 1982.

The price and procurement system was generally ineffective in stimulating higher cereal production because only a fraction of all soft wheat and very small amounts of other major grains were ever purchased. Support price policies never reached the majority of grain producers because of a combination of factors. Among these were limited own transport for small farmers, few government purchasing sites, producer failure to meet quality standards, and marketing board budget and handling constraints. As a result, cereal output is lower than would have been optimally possible.

Results for Consumers

The Government heavily subsidized consumers for two of the three selected staples, transferring a net average of DH725 million ($87 million) per year, or 15 percent of total cost (table 3) (DH = dirham). Over time, the aggregate three-

Table 2--Morocco: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	2,183	1,971	1,989	2,359	3,809	2,428	4,019	3,927
Producer price	DH/ton	1,400	1,400	1,500	1,800	2,000	2,000	2,000	2,200
Value to producers	Mil. DH	3,056	2,759	2,984	4,246	7,618	4,856	8,038	8,639
Policy transfers to producers--									
Marketing board subsidy	Mil. DH	241	134	62	163	984	626	864	841
Fertilizer subsidy	Mil. DH	118	-13	281	173	-63	-189	-86	-295
Foreign exchange subsidy	Mil. DH	-324	-387	-230	130	-582	-561	-1361	-1253
Credit subsidy	Mil. DH	16.5	14.4	9.9	20.0	47.7	41.3	50.3	51.8
Import transport subsidy	Mil. DH	-27.0	-22.4	-21.4	-23.9	-69.0	-40.6	-81.0	-83.5
Irrigation subsidies	Mil. DH	56.6	61.1	73.9	68.9	88.1	78.0	89.8	95.0
Total policy transfers	Mil. DH	80	-212	176	532	405	-45	-524	-643
PSE (per unit value)	Percent	2.6	-7.7	5.9	12.5	5.3	-0.9	-6.5	-7.4
PSE (per unit quantity)	DH/ton	36.8	-107.8	88.5	225.4	106.4	-18.5	-130.3	-163.6
	US$/ton	6.1	-15.2	10.0	22.4	11.7	-2.2	-15.9	-19.3
Corn:									
Level of production	1,000 tons	247	258	264	321	307	240	358	403
Producer price	DH/ton	1,000	1,300	1,600	1,800	1,800	1,800	1,361	867
Value to producers	Mil. DH	247	335	422	578	553	432	487	350
Policy transfers to producers--									
Marketing board subsidy	Mil. DH	19.1	21.6	44.7	56.1	112.0	58.6	0.0	0.0
Fertilizer subsidy	Mil. DH	3.5	-0.3	6.5	4.2	-1.2	-3.3	-1.5	-5.0
Foreign exchange subsidy	Mil. DH	-29.1	-44.2	-20.0	15.1	-46.8	-44.5	-118.7	-68.9
Credit subsidy	Mil. DH	1.3	1.8	1.4	2.7	3.5	3.7	3.1	2.1
Irrigation subsidies	Mil. DH	15.6	16.9	18.5	17.2	20.0	19.2	19.6	20.1
Total policy transfers	Mil. DH	10.6	-4.4	51.2	95.3	87.5	33.6	-97.5	-51.7
PSE (per unit value)	Percent	4.3	-1.3	12.1	16.5	15.8	7.8	-20.0	-14.8
PSE (per unit quantity)	DH/ton	43	-17	194	297	285	140	-272	-128
	US$/ton	7.1	-2.4	22.0	29.5	31.3	16.7	-33.2	-15.1
Cotton:									
Level of production	1,000 tons	6	7	4	8	8	11	9	9
Producer price	DH/ton	11,770	13,115	16,393	18,033	19,672	19,672	19,672	20,656
Value to producers	Mil. DH	71	92	66	144	157	216	177	186
Policy transfers to producers--									
Marketing board subsidy	Mil. DH	27.0	17.9	15.8	66.8	111.9	107.4	109.1	95.2
Fertilizer subsidy	Mil. DH	7.9	-0.7	14.7	9.3	-2.7	-7.4	-3.3	-11.3
Foreign exchange subsidy	Mil. DH	-8.0	-14.9	-4.9	3.9	-10.1	-33.3	-25.2	-25.2
Credit subsidy	Mil. DH	0.4	0.5	0.2	0.7	1.0	1.8	1.1	1.1
Irrigation subsidies	Mil. DH	3.7	4.0	4.3	4.0	4.7	4.5	4.6	4.7
Total policy transfers	Mil. DH	31.0	6.7	30.2	84.7	104.8	73.0	86.4	64.5
PSE (per unit value)	Percent	43.9	7.3	46.0	58.7	66.6	33.7	48.8	34.7
PSE (per unit quantity)	DH/ton	5,165	954	7,544	10,591	13,101	6,632	9,595	7,171
	US$/ton	858	134	856	1,053	1,440	790	1,170	845
Sugar:									
Level of production	1,000 tons	384	470	451	490	439	540	690	610
Producer price	DH/ton	144	144	162	174	199	199	195	217
Value to producers	Mil. DH	55	68	73	85	87	107	135	132
Policy transfers to producers--									
Marketing board subsidy	Mil. DH	-5.9	-16.9	14.7	16.9	25.1	44.3	52.6	55.7
Fertilizer subsidy	Mil. DH	10.1	-0.9	18.8	11.9	-3.4	-9.5	-4.2	-14.4
Foreign exchange subsidy	Mil. DH	-65	-108	-40	19	-77	-161	-343	-310
Credit subsidy	Mil. DH	0.3	0.4	0.2	0.4	0.5	0.9	0.8	0.8
Irrigation subsidies	Mil. DH	24	26	29	28	34	33	35	37
Total policy transfers	Mil. DH	-37	-100	23	76	-21	-92	-259	-231
PSE (per unit value)	Percent	-66	-147	31	90	-24	-86	-192	-175
PSE (per unit quantity)	DH/ton	-95	-212	50	155	-48	-170	-375	-379
	US$/ton	-16	-30	6	15	-5	-20	-46	-45

See footnotes at end of table.

Continued--

commodity CSE fluctuated, with peaks in 1984 and 1989 and troughs in 1987 and 1988. The upswings coincided with sharp divergences between the international reference price and the local prices. For example, the import unit value of wheat flour jumped 46 percent in 1984 and 70 percent in 1989, while domestic prices increased 15 percent in 1984 and declined 9 percent in 1989. Of the two policy interventions, the overvalued exchange rate was more important than the price subsidy in transferring value to consumers.

Table 2--Morocco: Producer subsidy equivalents by commodity--Continued

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Barley:									
Level of production	1,000 tons	2,334	1,228	1,405	2,025	2,820	1,543	3,454	2,999
Producer price	DH/ton	1,416	930	1,281	1,440	1,812	1,968	793	1,109
Value to producers	Mil. DH	3,305	1,142	1,800	2,916	5,110	3,037	2,740	3,325
Policy transfers to producers--									
Marketing board subsidy	Mil. DH	176	9	12	145	566	200	0	0
Foreign exchange subsidy	Mil. DH	-225	-165	-123	84	-384	-295	-667	-655
Credit subsidy	Mil. DH	18	6	6	14	32	26	17	20
Irrigation subsidies	Mil. DH	32	25	29	21	22	14	20	23
Total policy transfers	Mil. DH	1	-125	-76	264	235	-56	-630	-613
PSE (per unit value)	Percent	0.0	-10.9	-4.2	9.1	4.6	-1.8	-23.0	-18.4
PSE (per unit quantity)	DH/ton	0	-101	-54	130	83	-36	-182	-204
	US$/ton	0.0	-14.3	-6.1	13.0	9.2	-4.3	-22.2	-24.1

DH = Dirham.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Table 3--Morocco: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. DH	105	-174	311	1,162	-727	-1,333	-1,893	-278
Foreign exchange subsidy	Mil. DH	850	1,112	743	-359	1,230	1,540	1,567	1,948
Policy transfers by commodity:									
Wheat flour	Mil. DH	1,835	1,922	2,365	2,430	2,073	1,496	372	1,968
Edible oils	Mil. DH	0	1	1	1	1	0	1	1
Sugar	Mil. DH	-881	-985	-1,312	-1,629	-1,571	-1,289	-699	-299
CSE by commodity:									
Wheat flour	Percent	86	82	148	92	66	46	14	119
Edible oils	Percent	40	46	66	53	40	33	36	50
Sugar	Percent	-45	-44	-57	-66	-54	-48	-24	-10
Total policy transfers	Mil. DH	955	938	1,054	803	503	207	-325	1,670
Cost to consumers	Mil. DH	4,072	4,596	3,905	5,115	6,045	5,933	5,530	4,620
Total commodity CSE	Percent	23	20	27	16	8	3	-6	36

DH = Dirham.
CSE = Consumer subsidy equivalent.

Results by Commodity

Sugar consumers were consistently taxed at an annual average rate of 44 percent of consumer cost (table 4). The internal retail sugar price was reportedly below refining cost, but compared with the international reference price, Moroccan consumers were penalized (6). Over the study period, the quantity subsidized increased 20 percent, the domestic price, 26 percent, and the reference price, 98 percent. Because per capita sugar consumption is very high, an estimated 31 kilograms per person per year, policymakers are reluctant to institute radical changes (21).

The annual average wheat flour support was 82 percent (fig. 2). The CSE trended upward but dipped in 1986-88. In these years, sharp drops in import unit values explained the declines in CSE's.

The annual average edible vegetable oil CSE was 46 percent, a fairly substantial percentage, but the actual transfers were small, averaging DH600,000 ($73,000) a year. While retail prices changed sharply at the beginning of the period, they remained unchanged after 1986. The level of consumption, however, continued to rise throughout the period.

Results by Policy

Of the two policy mechanisms, price intervention and currency overvaluation, the latter succeeded in transferring four times as much value to consumers at an annual average of DH1.08 billion ($130 million), compared with a negative DH353 million ($43 million). Nonetheless, better subsidy targeting became evident in 1989, when the price of high-quality flour was not subsidized. The lower quality flour distributed in the country is an inferior kind usually purchased by the poor, while the higher quality flour is more commonly

Table 4—Morocco: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	2,643	2,891	2,955	2,975	3,590	3,135	3,686	3,507
Quantity subsidized	1,000 tons	1,680	1,716	1,159	1,787	1,824	1,884	1,530	1,000
Consumer price	DH/ton	1,268	1,363	1,379	1,476	1,727	1,727	1,744	1,650
Cost to consumers	Mil. DH	2,130	2,339	1,598	2,637	3,150	3,254	2,668	1,650
Policy transfers to consumers--									
Price subsidy	Mil. DH	1,129	1,010	1,706	2,756	1,000	227	-752	489
Foreign exchange subsidy	Mil. DH	707	913	660	-326	1,073	1,268	1,124	1,479
Total policy transfers	Mil. DH	1,835	1,922	2,365	2,430	2,073	1,496	372	1,968
CSE (per unit value)	Percent	86	82	148	92	66	46	14	119
CSE (per unit quantity)	DH/ton	1,092	1,120	2,041	1,360	1,136	794	243	1,968
	US$/ton	181	158	232	135	125	95	30	232
Edible oils:									
Level of consumption	1,000 tons	180	190	203	200	209	209	238	240
Wholesale price	DH/ton	4.60	6.00	6.00	6.33	7.00	7.00	7.00	7.00
Cost to consumers	Mil. DH	0.83	1.14	1.22	1.27	1.46	1.46	1.67	1.68
Policy transfers to consumers--									
Price subsidy	Mil. DH	0.19	0.30	0.66	0.75	0.35	0.13	0.15	0.43
Foreign exchange subsidy	Mil. DH	0.14	0.23	0.15	-0.07	0.24	0.35	0.44	0.42
Total policy transfers	Mil. DH	0.33	0.53	0.81	0.67	0.58	0.48	0.59	0.85
CSE (per unit value)	Percent	40	46	66	53	40	33	36	50
CSE (per unit quantity)	DH/ton	2	3	4	3	3	2	2	4
	US$/ton	0.31	0.39	0.45	0.33	0.31	0.27	0.30	0.42
Sugar:									
Level of consumption	1,000 tons	680	712	740	672	707	722	741	783
Quantity subsidized	1,000 tons	600	620	631	650	694	650	700	725
Consumer price	DH/ton	3,236	3,638	3,654	3,811	4,169	4,120	4,086	4,094
Cost to consumers	Mil. DH	1,941	2,255	2,306	2,477	2,893	2,678	2,860	2,968
Policy transfers to consumers--									
Price subsidy	Mil. DH	-1,024	-1,184	-1,395	-1,595	-1,727	-1,561	-1,141	-767
Foreign exchange subsidy	Mil. DH	143	199	84	-33	156	272	443	469
Total policy transfers	Mil. DH	-881	-985	-1,312	-1,629	-1,571	-1,289	-699	-299
CSE (per unit value)	Percent	-45	-44	-57	-66	-54	-48	-24	-10
CSE (per unit quantity)	DH/ton	-1,468	-1,588	-2,079	-2,505	-2,263	-1,983	-998	-412
	US$/ton	-244	-223	-236	-249	-249	-236	-122	-49

DH = Dirham.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

consumed by the affluent urban middle and upper classes (10). This change reflects an attempt by the Government to better control budgetary outlays and yet meet equity goals.

Conclusions

For this report, Morocco's agricultural policies and developments were surveyed and quantified between 1982 and 1989. During this period, Moroccan policymakers began to implement far-reaching economic reforms. Aggregate producer support diminished in agriculture, while consumer food subsidies fluctuated but remained at a high positive level.

More changes are expected in the marketing channels under Morocco's structural adjustment program. For example, all crops are scheduled to be liberalized, and the grain marketing board is expected to be either abolished or reformed. The new challenge facing Moroccan policymakers is how to attain economic efficiency without sacrificing goals of price and supply stabilization as the move is made away from state trade and price controls.

The price and procurement support system was not optimally effective, especially in stimulating higher cereal production. Because of logistical problems, only a fraction of all soft wheat and very small amounts of the other major grains were ever purchased. Thus, despite the appearance of support, grain farmers were not fully protected from the effects of subsidizing soft wheat flour for consumers. On the other hand, consumers, both rich and poor, clearly benefited from the generally effective enforcement of subsidized food prices.

Since Morocco is a net food importer, liberalization of agricultural trade through the General Agreement on Tariffs and Trade (GATT) could imply higher food import bills if the talks succeed in lowering export subsidies in the leading cereal producing and exporting nations. Further research is needed on Moroccan agricultural supply response, including welfare implications of alternative market-based price stabilization schemes (reference price linking, price bands, and the like). Further study is needed on the foreign exchange effects of increased import cereal prices, with and without export market access constraints for Morocco's high-valued products.

Figure 2

Morocco: Wheat flour consumer subsidy equivalent

Percent

Price ▬   Foreign exchange ▨   Total ━━
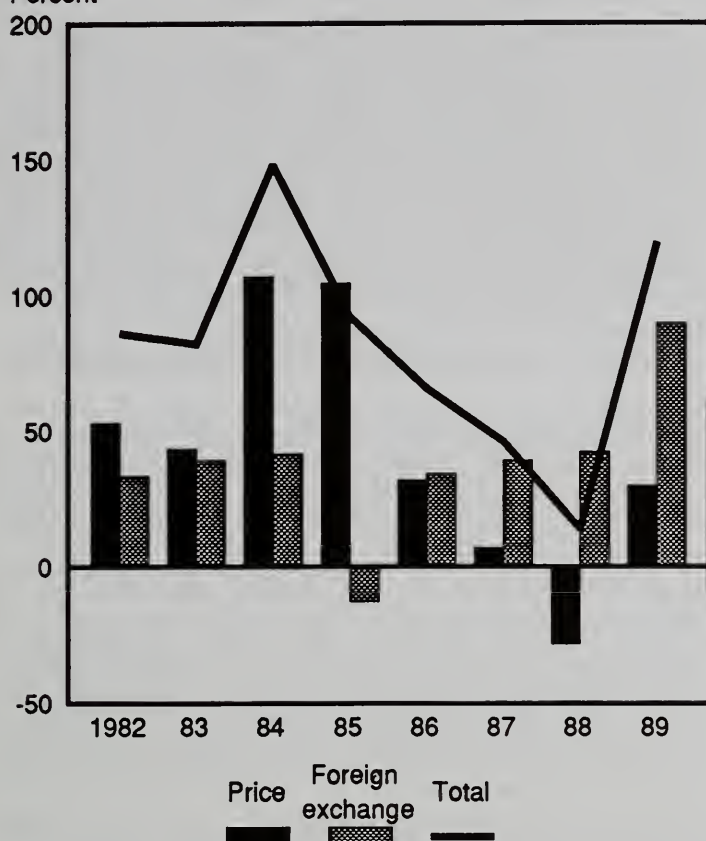
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Appendix: Methodology

This appendix explains how the effects of the policy interventions analyzed between 1982 and 1989 were estimated. These policies include marketing board activities; exchange rate management; subsidies for inputs, such as credit, fertilizer, and irrigation; and transportation for imported grain.

The associated merits and biases of the selected approaches are noted here.

Pricing Policy

Price controls were enforced by marketing boards that affected both the PSE and the CSE. The level of marketing board intervention was estimated as the difference between the official producer price plus a fixed margin for transportation and marketing cost (or consumer price paid) and the border price multiplied by total ONICL purchases by grain type or total production for sugar and cotton (or subsidized consumption quantities). The marketing board intervention, in effect, combines price supports and state marketing control. Because of the difficulty in separating the effects of these two policies, the conclusions are given in summations.

Because of the differences in the pricing and marketing of soft and hard wheat, disaggregated data were used to estimate the level of intervention, after which the amounts were summed. For example, soft wheat prices are generally supported above the open market rate and the import parity price. The official price for soft wheat between 1982 and 1984 averaged 150 percent above the import parity price (transported 175 kilometers inland) and an average 25 percent over the market price (*19*). Commercialization patterns are also different. Until 1988, nearly half of all soft wheat was sold through government channels. Only 4 percent of hard wheat was marketed in this way (*19*). Hard wheat is mostly sold through weekly village markets (souks) and independent traders, and unofficial prices averaged 25 percent higher than the government floor price for 1982-84. Moroccan consumers seem willing to pay a premium for hard wheat because of taste preferences.

Official producer prices and official marketing board purchases were used for barley and corn PSE estimates. Barley has been mostly marketed since 1984 on a free market, with the same price structure as hard wheat. Barley prices have experienced sharp seasonal and annual price movements because of fluctuating output and exports. Corn is also usually a free-market crop, but its price structure is unknown. Free market prices for all cereals are generally reported to be below official support prices soon after the harvest season (July and August), when most producers sell their grain to meet debt obligations (*14*). Corn and barley prices were fully liberalized in 1988 and 1989, and the border price was used to represent the producer price for those years (*6*).

The industrial crops, cotton and sugar, are sold mainly through government channels (*6*). Accordingly, official producer prices were compared with either world or farmgate-equivalent reference prices. Ocean freight, port fees, refining, and transportation costs were used to derive a weighted farmgate price equivalent for raw sugar beet and cane. Seed cotton official producer prices were converted to a lint equivalent, using a 30.5-percent ginning rate. Production quantities were to a lint equivalent.

When we calculated wheat flour and sugar CSE's, we used weighted prices for product differentiation at the retail level.

Two kinds of flour are involved: a "deluxe" high-quality brand and a lower quality "national" brand. The weights were the quantity shares of each differentiated product in the total quantity subsidized and consumed. Reference prices for flour were import unit values and incorporated some degree of concession, reflecting the competition for the Moroccan market between the European Community and the United States. A comparison with a data series based on a world price of un-milled wheat transported to Morocco and converted to flour (factor equal to 0.70) showed negligible differences. Therefore, import unit values were used because of greater transparency. The raw Caribbean sugar price, the closest to a free-market price, was converted to a refined border sugar price and used as the reference price for the sugar CSE.

Foreign Exchange Rate Policy

The effect of foreign exchange rate controls can be measured as the percentage of currency overvaluation multiplied by the international market value of each commodity's production or consumption. The method estimates the free-market equilibrium rate, which corrects for current account imbalances and for the effects of trade policies as reported by Hasan Tuluy and Lynn Salinger (19). Their data series ended in 1984, so extrapolations were based on percentage changes in the domestic and French consumer price indexes (CPI) relative to official exchange rate changes. Since France is Morocco's leading trading partner, its CPI was used to indicate changes in the equilibrium rate.

Caution is needed to interpret the barley, corn, and sugar estimates. While exchange rate overvaluation directly affects exporters of agricultural crops, the effect is more indirect with nonexported or highly protected commodities because of cheapened import inputs that lower both the cost of production and the signal of reference price in decisionmaking. None of the studied commodities is exported, and so more attention should be paid to the PSE, excluding the foreign exchange component. This modified measure reflects the relative direct levels of support or taxation. Indirect measures are not quantified.

Fertilizer Policy

When calculations were made of the effect of fertilizer subsidies on producers, farmgate prices for urea were compared with the imported price, allowing a 10-percent markup for transportation at the official exchange rate. The fertilizer price was converted to nutrient basis, and if the international price equivalent in dirhams exceeded the local price, a per unit subsidy was shown to exist. If the reverse held, a tax was present. The PSE is this determined rate multiplied by the quantity of fertilizer used on each crop.

Morocco exports large quantities of phosphate-based fertilizer, but imports nitrogenous fertilizers, which were assumed to be a more important nutrient in the agricultural production process. The subsidy outlays were consequently assumed to be directed to cover imported nitrogenous fertilizers.[5]

Credit Policy

Estimates of credit subsidies were based on the credit subsidy allocated to crops according to the share of agricultural value in each crop. The estimate was derived by multiplying the amount of credit disbursed to agriculture by the interest rate differential between lending rates on nonagricultural and agricultural loans. Since the agricultural interest rate is lower, it represents preferential treatment. The subsidy value was then allocated to the various crops based on respective share of total agricultural value.

Irrigated crops and fruits receive a greater share of the subsidies than do other crops, especially cereals. A recent study showed that irrigated cash crops receive 70 percent of the input and credit subsidies (17, p. 182). On average, between 1982 and 1984, only 15 percent of the area of soft wheat was irrigated and less than 15 percent of the areas of hard wheat, barley, and corn (17, 19). Although we lack data on the distribution of irrigated cropland over the entire period and on credit distribution, the bias implied in using the value allocation approach seems defensible in that some correlation is found between credit use and marketed surplus.

Irrigation Policy

Since 1930, Morocco has invested heavily in irrigation infrastructure and has subsidized the distribution of water. Not until the last two decades were attempts made to recover a modest portion of the investment costs through user fees and taxes. The estimate is the sum of annualized capital costs and user fee receipts minus operational expenses for nine large-scale schemes. Commodity allocations are made according to area shares in the nine perimeters. Small- and medium-scale irrigated areas are unmeasured, and since most government outlays are for the nine large-scale areas, the exclusion of other irrigation schemes was not considered significant.

Import Transport Policy

The final intervention calculated is an indirect transportation subsidy. The Government pays the transport cost of imported wheat from port to flour mills.[6] This subsidy encourages millers to use imported grain instead of local grain, which they are prohibited from buying directly. Licensed commercial traders who supply the millers with domestic wheat incur transport costs that they pass on to millers, who then receive an allowance from the Government (4). Local producers, in contrast, absorb the full amount of transport cost between farmgate and the ONICL collection point (4). Thus, the intervention is a disincentive to local producers and is accordingly modeled as a hidden producer tax. This sum is calculated as the transport subsidy rate per ton of imported grain times the total wheat quantity purchased by ONICL.

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[5]Potash and phosphate fertilizers were not studied.

[6]In most years, only soft wheat is imported, and in those years when hard wheat is imported, its share of the total is very small.

Appendix table 1–Wheat: Calculation of Morocco's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	1,686	1,976	1,856	1,894	2,226	2,288	2,317	2,630
B. Production, total	1,000 tons	2,183	1,971	1,989	2,359	3,809	2,428	4,019	3,927
BA. Marketed production, soft	1,000 tons	479	356	307	323	922	520	1,081	1,080
BB. Marketed production, hard	1,000 tons	51	58	44	41	46	34	0	0
CA. Producer price, soft	DH/ton	1,400	1,400	1,500	1,800	2,000	2,000	2,000	2,200
CB. Producer price, hard	DH/ton	1,400	1,400	1,500	1,800	2,000	2,000	1,391	1,618
D. Producer value (B*CA)/1,000	Mil. DH	3,056	2,759	2,984	4,246	7,618	4,856	8,038	8,639
E. Policy transfers to producers:									
1. Price policy--1/									
a. Producer price, including marketing costs: soft	DH/ton	1,532	1,539	1,655	1,966	2,180	2,186	2,190	2,397
aa. Producer price, including marketing costs: soft	DH/ton	1,532	1,539	1,655	1,966	2,180	2,186	1,581	1,815
b. Border price, U.S. export unit value	US$/ton	179	171	168	151	128	126	170	191
c. Border price, U.S. export unit value	DH/ton	1,078	1,214	1,477	1,517	1,164	1,056	1,391	1,618
d. Price support, soft (1a-1c)*BA/1,000	Mil. DH	218	116	54	145	937	587	864	841
e. Price support, hard (1aa-1c)*BB/1,000	Mil. DH	23	19	8	18	47	38	0	0
f. Price support, total 1d+1e	Mil. DH	241	134	62	163	984	626	864	841
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	1,078	1,214	1,477	1,517	1,164	1,056	1,391	1,618
c. Foreign exchange subsidy -2a*2b*B/100,000	Mil. DH	-324	-387	-230	130	-582	-561	-1361	-1253
3. Fertilizer transfers--									
a. Fertilizer subsidy, urea	Mil. DH	379	-32	653	343	-94	-269	-116	-388
b. Fertilizer used on wheat	1,000 tons	310	401	431	505	669	700	746	760
c. Fertilizer PSE 3a*3b/1,000	Mil. DH	118	-13	281	173	-63	-189	-86	-295
4. Credit policy--									
a. Value, all agriculture	Mil. DH	15,983	17,043	21,567	29,756	29,702	22,856	23,157	24,662
b. Credit, all agriculture	Mil. DH	1,723	2,228	2,393	2,807	3,717	3,891	4,144	4,222
c. Interest rate subsidy	Percent	5	4	3	5	5	5	4	4
d. Credit support (D/4a)*((4b*4c)/100)	Mil. DH	16	14	10	20	48	41	50	52
5. Import transportation subsidy--1/									
a. Transportation subsidy rate	DH/ton	51	54	61	66	71	73	75	77
b. Marketed production, soft	1,000 tons	479	356	307	323	922	520	1081	1080
c. Marketed production, hard	1,000 tons	51	58	44	41	46	34	0	0
d. Transportation subsidy -(5b+5c)/1,000*5a	Mil. DH	-27	-22	-21	-24	-69	-41	-81	-83
6. Irrigation subsidy--									
a. Total irrigation subsidy	Mil. DH	159	172	189	176	204	195	200	206
b. Wheat share of area	Percent	36	36	39	39	43	40	45	46
c. Irrigation subsidy 6b/100*6a	Mil. DH	57	61	74	69	88	78	90	95
F. Total transfers to producers:									
1. Total (1f+2c+3c+4d+5d+6c)	Mil. DH	80	-212	176	532	405	-45	-524	-643
2. Producer subsidy equivalents (F1/D)*100	Percent	2.6	-7.7	5.9	12.5	5.3	-0.9	-6.5	-7.4
G. Consumption	1,000 tons	2,643	2,891	2,955	2,975	3,590	3,135	3,686	3,507
GG. Quantity subsidized	1,000 tons	1,680	1,716	1,159	1,787	1,824	1,884	1,530	1,000
H. Consumer price	DH/ton	1,268	1,363	1,379	1,476	1,727	1,727	1,744	1,650
I. Consumer cost (GG*H)/1,000	Mil. DH	2,130	2,339	1,598	2,637	3,150	3,254	2,668	1,650
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, import unit value	DH/ton	1,940	1,952	2,850	3,018	2,275	1,848	1,253	2,139
b. Consumer price	DH/ton	1,268	1,363	1,379	1,476	1,727	1,727	1,744	1,650
c. Price support (1a-1b)*GG/1,000	Mil. DH	1,129	1,010	1,706	2,756	1,000	227	-752	489
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	1,940	1,952	2,850	3,018	2,275	1,848	1,253	2,139
c. Foreign exchange subsidy (2a*2b*G)/100,000	Mil. DH	707	913	660	-326	1,073	1,268	1,124	1,479
K. Total transfers to consumers:									
1. Total (1c+2c)	Mil. DH	1,835	1,922	2,365	2,430	2,073	1,496	372	1,968
2. Consumer subsidy equivalent (K1/I)*100	Percent	86.2	82.2	148.0	92.2	65.8	46.0	14.0	119.3

ha. = Hectare.
DH = Dirham.
PSE = Producer subsidy equivalent.
1/ Price and import transportation wedges of the PSE's are calculated using marketed rather than total production.

Appendix table 2--Corn: Calculation of Morocco's producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	400	435	384	401	395	368	396	406
B. Production	1,000 tons	247	258	264	321	307	240	358	403
BB. Marketed production	1,000 tons	68.7	57.0	56.7	84.2	136.7	51.5	0	0
C. Producer price	DH/ton	1,000	1,300	1,600	1,800	1,800	1,800	1,361	867
D. Producer value (B*C)/1,000	Mil. DH	247	335	422	578	553	432	487	350
E. Policy transfers to producers:									
1. Price policy--1/									
a. Producer price, including market costs	DH/ton	1,132	1,439	1,755	1,966	1,980	1,986	1,552	1,065
b. Border price, import unit value	US$/ton	142	149	110	129	128	101	166	102
c. Border price, import unit value	DH/ton	853	1,060	966	1,300	1,161	848	1,361	867
d. Price support (1a-1c)*BB/1,000	Mil. DH	19	22	45	56	112	59	0	0
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	853	1,060	966	1,300	1,161	848	1,361	867
c. Foreign exchange subsidy -2a*2b*B/100,000	Mil. DH	-29	-44	-20	15	-47	-45	-119	-69
3. Fertilizer transfers--									
a. Fertilizer subsidy, urea	Mil. DH	379	-32	653	343	-94	-269	-116	-388
b. Fertilizer used on corn	1,000 tons	9	10	10	12	13	12	13	13
c. Fertilizer PSE 3a*3b/1,000	Mil. DH	4	-0	7	4	-1	-3	-1	-5
4. Credit policy--									
a. Value, all agriculture	Mil. DH	15,983	17,043	21,567	29,756	29,702	22,856	23,157	24,662
b. Credit, all agriculture	Mil. DH	1,723	2,228	2,393	2,807	3,717	3,891	4,144	4,222
c. Interest rate subsidy	Percent	5	4	3	5	5	5	4	4
d. Credit support (D/4a)*((4b*4c)/100)	Mil. DH	1	2	1	3	3	4	3	2
5. Irrigation subsidy--									
a. Total irrigation subsidy	Mil. DH	159	172	189	176	204	195	200	206
b. Corn share of area	Percent	10	10	10	10	10	10	10	10
c. Irrigation subsidy 5b/100*5a	Mil. DH	16	17	18	17	20	19	20	20
F. Total transfers to producers:									
1. Total (1d+2c+3c+4d+5c)	Mil. DH	11	-4	51	95	87	34	-97	-52
2. Producer subsidy equivalents (F1/D)*100	Percent	4.3	-1.3	12.1	16.5	15.8	7.8	-20.0	-14.8

ha. = Hectare.
DH = Dirham.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.
1/ The price wedge of the PSE's is calculated using marketed rather than total production.

Appendix table 3--Edible vegetable oils: Calculation of Morocco's consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Consumption	1,000 ton	180	190	203	200	209	209	238	240
B. Consumer price	DH/ton	5	6	6	6	7	7	7	7
C. Consumer cost (A*B)/1,000	Mil. DH	1	1	1	1	1	1	2	2
D. Policy transfers to consumers:									
1. Price policy--									
a. Border price, plus handling	DH/ton	6	8	9	10	9	8	8	9
b. Consumer price	DH/ton	5	6	6	6	7	7	7	7
c. Price support (1a-1b)*A/1,000	Mil. DH	0.2	0.3	0.7	0.7	0.3	0.1	0.1	0.4
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	6	8	9	10	9	8	8	9
c. Foreign exchange subsidy (2a*2b*A)/100,000	Mil. DH	0.1	0.2	0.1	-0.1	0.2	0.3	0.4	0.4
E. Total transfers to consumers:									
1. Total (1c+2c)	Mil. DH	0.3	0.5	0.8	0.7	0.6	0.5	0.6	0.8
2. Consumer subsidy equivalent (E1/C)*100	Percent	40.0	46.4	66.2	53.2	40.0	32.5	35.5	50.3

DH = Dirham.

Appendix table 4—Barley: Calculation of Morocco's producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	2,047	2,151	2,126	2,383	2,472	2,314	2,499	2,399
B. Production	1,000 tons	2,334	1,228	1,405	2,025	2,820	1,543	3,454	2,999
BB. Marketed production	1,000 tons	175	33	28	249	498	134	0	0
C. Producer price	DH/ton	1,416	930	1,281	1,440	1,812	1,968	793	1,109
D. Producer value (B*C)/1,000	Mil. DH	3,305	1,142	1,800	2,916	5,110	3,037	2,740	3,325
E. Policy transfers to producers:									
1. Price policy--1/									
a. Producer price, including market costs	DH/ton	1,699	1,116	1,537	1,728	2,174	2,362	952	1,330
b. Border price, import unit value									
plus transportation	US$/ton	116	117	127	114	114	104	97	131
c. Border price, import unit value	DH/ton	698	832	1,119	1,147	1,037	874	793	1,109
d. Price support (1a-1c)*BB/1,000	Mil. DH	176	9	12	145	566	200	0	0
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	698	832	1,119	1,147	1,037	874	793	1,109
c. Foreign exchange subsidy									
-2a*2b*B/100,000	Mil. DH	-225	-165	-123	84	-384	-295	-667	-655
3. Credit policy--									
a. Value, all agriculture	Mil. DH	15,983	17,043	21,567	29,756	29,702	22,856	23,157	24,662
b. Credit, all agriculture	Mil. DH	1,723	2,228	2,393	2,807	3,717	3,891	4,144	4,222
c. Interest rate subsidy	Percent	5	4	3	5	5	5	4	4
d. Credit support (D/3a)*((3b*3c)/100)	Mil. DH	18	6	6	14	32	26	17	20
4. Irrigation subsidy--									
a. Total irrigation subsidy	Mil. DH	159	172	189	176	204	195	200	206
b. Barley share of area	Percent	20	15	16	12	11	7	10	11
c. Irrigation subsidy 4b/100*4a	Mil. DH	32	25	29	21	22	14	20	23
F. Total transfers to producers:									
1. Total (1d+2c+3d+4c)	Mil. DH	1	-125	-76	264	235	-56	-630	-613
2. Producer subsidy equivalents (F1/D)*100	Percent	0.0	-10.9	-4.2	9.1	4.6	-1.8	-23.0	-18.4

ha. — Hectare.
DH — Dirham.
US$ — U.S. dollar.
PSE — Producer subsidy equivalent.
1/ The price wedge of the PSE's is calculated using marketed rather than total production.

Appendix table 5—Cotton (lint): Calculation of Morocco's producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	11	11	9	13	14	15	18	14
B. Production	1,000 tons	6	7	4	8	8	11	9	9
C. Producer price	DH/ton	11,770	13,115	16,393	18,033	19,672	19,672	19,672	20,656
D. Producer value (B*C)/1,000	Mil. DH	71	92	66	144	157	216	177	186
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price, including marketing costs	DH/ton	14,125	15,738	19,672	21,639	23,607	23,607	23,607	24,787
b. Border price, Liverpool composite	US$/ton	1,599	1,854	1,784	1,321	1,057	1,648	1,400	1,674
c. Border price, Liverpool composite	DH/ton	9,623	13,182	15,721	13,289	9,618	13,846	11,483	14,213
d. Price support (1a-1c)*B/1,000	Mil. DH	27	18	16	67	112	107	109	95
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	9,623	13,182	15,721	13,289	9,618	13,846	11,483	14,213
c. Foreign exchange subsidy -2a*2b*B/100,000	Mil. DH	-8	-15	-5	4	-10	-33	-25	-25
3. Fertilizer transfers--									
a. Fertilizer subsidy	Mil. DH	379	-32	653	343	-94	-269	-116	-388
b. Fertilizer use	1,000 tons	20.8	22.5	22.6	27.2	28.3	27.5	28.6	29.0
c. Fertilizer transfer (3a*3b)/1,000	Mil. DH	7.9	-0.7	14.7	9.3	-2.7	-7.4	-3.3	-11.3
4. Credit policy--									
a. Value, all agriculture	Mil. DH	15,983	17,043	21,567	29,756	29,702	22,856	23,157	24,662
b. Credit, all agriculture	Mil. DH	1,723	2,228	2,393	2,807	3,717	3,891	4,144	4,222
c. Interest rate subsidy	Percent	5	4	3	5	5	5	4	4
d. Credit support (D/4a)*((4b*4c)/100)	Mil. DH	0	0	0	1	1	2	1	1
5. Irrigation subsidy--									
a. Total irrigation subsidy	Mil. DH	159	172	189	176	204	195	200	206
b. Cotton share of area	Percent	2	2	2	2	2	2	2	2
c. Irrigation subsidy 5b/100*5a	Mil. DH	4	4	4	4	5	4	5	5
F. Total transfers to producers:									
1. Total (1d+2c+3c+4d+5c)	Mil. DH	31	7	30	85	105	73	86	65
2. Producer subsidy equivalents (F1/D)*100	Percent	43.9	7.3	46.0	58.7	66.6	33.7	48.8	34.7

ha. = Hectare.
DH = Dirham.
US$ = U.S. dollar.

Appendix table 6—Sugar: Calculation of Morocco's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	65	71	71	66	64	74	74	75
B. Production	1,000 tons	384	470	451	490	439	540	690	610
C. Producer price	DH/ton	144	144	162	174	199	199	195	217
D. Producer value (B*C)/1,000	Mil. DH	55	68	73	85	87	107	135	132
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	DH/ton	144	144	162	174	199	199	195	217
b. Border price, farmgate weighted price	DH/ton	159	180	129	139	141	116	119	125
c. Price support (1a-1b)*B/1,000	Mil. DH	-6	-17	15	17	25	44	53	56
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price, Caribbean plus transportation	DH/ton	1,229	1,424	1,144	1,047	1,331	1,360	2,043	2,578
c. Foreign exchange subsidy -2a*2b*B/100,000	Mil. DH	-65	-108	-40	19	-77	-161	-343	-310
3. Fertilizer transfers--									
a. Fertilizer subsidy, urea	Mil. DH	379	-32	653	343	-94	-269	-116	-388
b. Fertilizer used on sugar	1,000 tons	27	29	29	35	36	35	37	37
c. Fertilizer PSE, 3a*3b/1,000	Mil. DH	10	-1	19	12	-3	-9	-4	-14
4. Credit policy--									
a. Value, all agriculture	Mil. DH	15,983	17,043	21,567	29,756	29,702	22,856	23,157	24,662
b. Credit, all agriculture	Mil. DH	1,723	2,228	2,393	2,807	3,717	3,891	4,144	4,222
c. Interest rate subsidy	Percent	5	4	3	5	5	5	4	4
d. Credit support (D/4a)*((4b*4c)/100)	Mil. DH	0	0	0	0	1	1	1	1
5. Irrigation subsidy--									
a. Total irrigation subsidy	Mil. DH	159	172	189	176	204	195	200	206
b. Sugar share of area	Percent	15	15	16	16	17	17	18	18
c. Irrigation subisdy 5b/100*5a	Mil. DH	24	26	29	28	34	33	35	37
F. Total transfers to producers:									
1. Total (1c+2c+3c+4d+5c)	Mil. DH	-37	-100	23	76	-21	-92	-259	-231
2. Producer subsidy equivalents (F1/D)*100	Percent	-66	-147	31	90	-24	-86	-192	-175
G. Consumption	1,000 tons	680	712	740	672	707	722	741	783
GG. Quantity subsidized	1,000 tons	600	620	631	650	694	650	700	725
H. Consumer price	DH/ton	3,236	3,638	3,654	3,811	4,169	4,120	4,086	4,094
I. Consumer cost (GG*H)/1,000	Mil. DH	1,941	2,255	2,306	2,477	2,893	2,678	2,860	2,968
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, Caribbean	DH/ton	1,529	1,728	1,443	1,356	1,680	1,718	2,455	3,036
b. Consumer Price	DH/ton	3,236	3,638	3,654	3,811	4,169	4,120	4,086	4,094
c. Price support (1a-1b)*GG/1,000	Mil. DH	-1,024	-1,184	-1,395	-1,595	-1,727	-1,561	-1,141	-767
2. Foreign exchange policy--									
a. Overvaluation	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7
b. Border price	DH/ton	1,529	1,728	1,443	1,356	1,680	1,718	2,455	3,036
c. Foreign exchange subsidy (2a*2b*G)/100,000	Mil. DH	143	199	84	-33	156	272	443	469
K. Total transfers to consumers:									
1. Total (1c+2c)	Mil. DH	-881	-985	-1,312	-1,629	-1,571	-1,289	-699	-299
2. Consumer subsidy equivalent (K1/I)*100	Percent	-45.4	-43.7	-56.9	-65.7	-54.3	-48.1	-24.4	-10.1

ha. = Hectare.
DH = Dirham.
PSE = Producer subsidy equivalent.

Nigeria

By Carl C. Mabbs-Zeno

Economic and Agricultural Developments

Nigeria is the seventh largest nation in Africa in land area, but with over 110 million citizens, it has the largest population on the continent and the 10th largest in the world. Despite this relatively high density, Nigeria has ample land for agriculture in various ecological zones defined mainly by rainfall. About 40 percent of the land is under cultivation, including that which is fallow. Most of the population still lives in rural areas, with agriculture accounting for as much as 70 percent of employment and 30 percent of gross domestic product (GDP).

Recent change in Nigeria's economy has been closely linked to its oil wealth. Oil has been exported from Nigeria since 1958, but this product did not come to dominate the economy until after the civil war that ended in 1970. The sudden increase in export revenue from oil in the early 1970's and again in the early 1980's strengthened the state and dramatically raised expectations for living standards. Export earnings, spurred by oil revenues, increased threefold between 1975 and 1980, while real GDP expanded 4 percent per year. The state captured a large portion of the revenues and extended its controls. The subsequent decline in other economic sectors was also sudden and massive. The status of export agriculture declined from that of the leading sector to one of consistently low performance. Oil prices, after peaking in the early 1980's, were cut in half by the end of the decade. Nigeria's export earnings and overall economy suffered as a result. Real GDP stagnated through the mid-1980's and only recently has begun to rise.

The role of government significantly shifted in 1986, with the initiation of a structural adjustment program (SAP). The program followed the pattern of recommendations from international lending agencies, which emphasized greater reliance on market incentives throughout the economy.

The policy reforms, designed to aid agriculture in the first years of the SAP, relied on price increases to raise production. Prices did rise, and some crops responded immediately. The response in these years did not reflect new investment, since most of the increases were in tree crops that did not have time to mature and to contribute to output. In the longer run, however, the production increase may be sustained by extensive new plantings, currently underway, of cocoa and rubber.

The quantity of food crops produced generally rose after the SAP was introduced, but the rate of increase was lower than was that for cash crops. Cassava, yam, and corn were the only major food crops that failed to exceed the production levels of 1970. That record contrasts with that of cash crops, of which the production had generally decreased so much that the recovery after 1986 was insufficient to set new records. In 1988, producers of food crops were generally planning to expand, but not as consistently as were cash crop producers.

Policies in the 1980's

The SAP consists of policy reforms in all areas of the economy. As a result of these reforms, international financial arrangements were renegotiated with public and private creditors. The policy reforms have not always replaced government control with market forces. Each area of reform has experienced intermittent resurgence of government control even while generally following the direction planned in 1986.

Following the Nigerian President's announcement of wide-reaching economic reforms in June 1986, the International Monetary Fund immediately began negotiating a standby agreement with Nigeria. In September 1986, the Nigerian Government signed a letter of intent, which was ratified by the Fund's Executive Board on December 12 of that year. The agreement was worth as much as US$760 million, but its principal importance lay in freeing other international lenders to reach agreement. The lenders attached conditions to their loans that maintained or extended the policy reforms.

Macroeconomic and Trade Policy Developments

The plan for structural adjustment included tight monetary policy, in which the money supply would be restricted to control inflation. The instruments controlling money supply operate mainly through credit availability and bank liquidity. The Central Bank uses several tools, including (1) an annual ceiling on credit growth by banks, (2) a cash ratio on demand deposits, which has the effect of a reserve requirement for commercial (but not merchant) banks, (3) adjustments in the rediscount rate, and (4) numerous selective credit controls. Credit to the Government further effects money supply.

The central reform in the SAP was decontrol of foreign currency exchanges. The first step toward market valuation of the currency was termed the second-tier foreign exchange market (SFEM) and was instituted in September 1986. The first tier of the currency market was maintained at officially overvalued rates for debt repayment and payments to interna-

tional organizations, although the level of overvaluation was reduced at irregular intervals. The second tier of the currency market, used for all other transactions, was essentially floating.

In July 1987, the two tiers were unified in a foreign exchange market at rates close to their open-market level. Complete unification was achieved in January 1989, when the autonomous rate for the private sector was abolished. The rules for determining the rates have varied as different auction methods have been applied, resulting in some appreciation of the naira, especially in 1987, but the naira's value has generally remained much closer to the open-market value. The black market has become much less active than it was in the decade before 1986.

A new tariff schedule was instituted in 1988 with a plan for the following 7 years. The schedule did not allow for tariffs higher than the ones that had prevailed before the SAP. On average, the tariff reductions were not large. Agricultural commodities were protected at about the same rate as commodities from other sectors that involved unbanned goods. The most important bans, however, concerned agricultural imports, resulting in protection for agriculture relative to manufacturing.

Import licensing before 1986 had the effect of placing quantitative restrictions on imports. Licenses were issued according to the availability of foreign exchange, but permitted levels for the year were not announced in advance. Actual imports represent the best record of the effective quotas. The list of imports banned in 1986 emphasized agricultural products, including rice, corn, wheat, vegetable oil, eggs in shell, fish, fruits, live poultry, and vegetables.

Agricultural Policy Developments

The principal agricultural goals of the SAP were (1) to rapidly increase food production and thereby reduce food imports and (2) to increase output of traditional export crops to raise incomes and reduce dependence on oil exports. Measures taken to achieve these goals included abolishing commodity marketing boards, increasing availability of fertilizer and credit, banning imports of wheat, corn, rice, vegetable oil, poultry, and animal feed, and devaluing the exchange rate.

Producer Pricing Policies

Commodity prices were controlled by the Nigerian Government through several mechanisms before the SAP. Prices paid to producers of most cash crops were dictated by commodity boards. Various inputs, notably fertilizer and petrol, were subsidized. The prices of import substitution commodities were affected by the controls on imports. All prices of tradables were also affected by the controls on foreign exchange that led to overvaluation of the naira.

The marketing boards were only effective in controlling the price of commodities that passed through ports to be exported, such as cocoa and rubber, or through mills, such as cotton, wheat, and rice. The minimum price was often set well below the expected market price for food crops. The marketing board for root crops lasted only 2 years because it was ineffective. Even for commodities of which prices were

affected by a marketing board, the farmgate price often differed significantly from the announced price because buying agents were able to influence the transaction. The boards served various marketing functions, but price control was their most conspicuous role.

With the loss of marketing boards and with currency devaluation, the real prices of most cash crops rose abruptly. Real producer prices of four major cash crops (cocoa, cotton, peanuts, and palm kernels) rose an average of 133 percent during 1986. The real prices were eroded by inflation in subsequent years, but cotton and palm kernel prices remained above the highest real prices of 1977-86.

The real producer prices of food crops rose after 1986, especially in 1987, but except for rice, these prices have not reached the levels of 1975-83. Real food crop prices only recovered from a 3-4 year dip. This pattern contrasts with that of cash crops, of which real prices generally exceeded any earlier ones.

Marketing Policies

By the time the SAP was formally launched, the Nigerian Government was already selling many of its parastatals, especially those engaged in agricultural production. Six of the 11 government companies engaged in direct agricultural production were for sale by mid-1986. All agricultural production by the Government was planned to be brought to an end, and the SAP therefore specified that the River Basin Development Authorities would cease from agricultural production, even though these agencies remained active in development of water resources.

The Government remains involved with storage (constructing modern storage facilities and holding part of the country's strategic reserves) and inspection of various export commodities.

Input Policies

The subsidies on fertilizer were apparently targeted for removal when the SAP was conceived. The Government was to withdraw from "importation, transportation, and distribution of fertilizers" (3).[1] Real subsidy levels on fertilizer rose after the SAP.

The ability of the Government to enforce its fertilizer price has apparently changed over time, but documentation of this policy is scanty. An unpublished study found that 40 percent of the fertilizer used in 1989 passed to farmers outside official channels. In that year, farmers paid three times the official price for such fertilizer (8). Also in 1989, the States of Nigeria were directed to sell fertilizer at the same price as they bought it from Federal sources, but at least two States, Niger and Gongola, charged a margin for their marketing costs.

Just as the price of fertilizer did not always reflect official policy, the quantity of it reaching farmers was not at full offi-

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

cial levels. Since neighboring countries do not support fertilizer sales at nearly the subsidy in Nigeria, considerable incentive exists for unofficial exports. Such exports have been estimated at 20 percent of Nigerian imports and production for 1983-87 (8). Disappearance at the port has independently been estimated at 9 percent of imports for 1977-84 (4).

The petroleum subsidy was explicitly targeted for removal even before the SAP. This subsidy affects agriculture mainly through its effect on transportation costs rather than through production costs. The revenue generated by removal of the subsidy was earmarked for use in funding the Directorate of Food, Road, and Rural Infrastructures (DFRRI), a use important to rural people (3). The subsidy was not, however, eliminated, even though the DFRRI was established and is now functioning.

Consumer Policies

Trade restrictions have had the largest influence on consumer prices. Import bans for grains were imposed in 1985 and 1986 to lower the cost of food imports and to stimulate domestic food production. Following the import bans, prices of wheat flour and barley rose. These price increases, coming with lowered incomes, induced consumers to substitute lower priced domestically produced commodities, such as cassava gari, sorghum, and rice. The demand for these products consequently drove up their prices as well. Between 1987 and 1989, the real price of cassava rose more than threefold. The real rice price nearly doubled.

Estimation of Policy Intervention in Agriculture

In this report, subsidy equivalents are estimated for several crops in different subsectors. The estimates are calculated for 1982-89 to place the SAP reforms in a historical context. However, because of data constraints, relatively few policies are isolated in the estimates.

Producer subsidy equivalents (PSE's) were measured for wheat, white corn, rice, sugar, cotton, and cocoa. Effects on consumers were measured for all these with the exception of cocoa and white corn.

Results for Producers

Total transfers from government policies to producers of the crops studied here ranged from taxation of 42 percent of producer revenues in 1984 to a subsidy of 18 percent in 1987 (table 1). The net effect on producer revenue has been moderate compared with subsidies in other countries.

Results by Commodity

Of the six commodities for which PSE's were calculated, a pattern exists of taxation on the cash crops and of subsidy on the food crops, especially before 1986 (table 2). Corn producers were subsidized throughout the study period, but relative to producer revenue, these subsidies were negligible. Wheat producers were taxed between 1982 and 1985. Wheat sup-

Table 1--Nigeria: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Pesticide subsidy	Mil. Nr.	4	4	6	3	5	4	12	6
Credit subsidy	Mil. Nr.	6	7	9	8	6	5	15	22
Foreign exchange	Mil. Nr.	-607	-766	-1,615	-1,208	-1,078	127	-845	-1,079
Tariff	Mil. Nr.	24	71	114	118	48	137	217	407
Fertilizer subsidy	Mil. Nr.	30	43	51	57	75	189	285	271
Marketing board	Mil. Nr.	31	15	-32	-37	149	0	0	0
Nontariff border controls	Mil. Nr.	797	448	872	1,043	1,113	185	757	324
Policy transfers by commodity:									
Wheat	Mil. Nr.	-1	-3	-5	-1	5	25	118	154
Corn (white)	Mil. Nr.	21	28	35	36	43	97	154	138
Rice (milled)	Mil. Nr.	590	213	455	697	800	262	450	-149
Sugar	Mil. Nr.	-11	-16	-17	-16	-12	17	16	39
Cotton	Mil. Nr.	-34	-17	-55	-36	-63	176	160	287
Cocoa	Mil. Nr.	-281	-383	-1,008	-696	-456	67	-456	-517
PSE by commodity:									
Wheat	Percent	-13	-36	-45	-28	42	65	74	61
Corn (white)	Percent	2	2	2	2	3	8	4	3
Rice (milled)	Percent	139	60	80	98	116	36	38	-8
Sugar	Percent	-138	-167	-289	-241	-137	40	27	31
Cotton	Percent	-136	-99	-210	-171	-90	65	49	80
Cocoa	Percent	-138	-211	-472	-422	-106	9	-18	-18
Total policy transfers	Mil. Nr.	284	-178	-595	-16	317	646	441	-48
Value to producers	Mil. Nr.	1,903	1,843	2,790	2,497	2,641	3,024	8,404	10,643
Total commodity PSE	Percent	15	-10	-21	-1	12	21	5	-0

Nr. = Naira.
PSE = Producer subsidy equivalent.

Table 2--Nigeria: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 ton	26	26	27	10	15	30	50	60
Producer price	Nr./ton	280	280	400	450	800	1,300	3,200	4,200
Value to producers	Mil. Nr.	7	7	11	5	12	39	160	252
Policy transfers to producers--									
Fertilizer subsidy	Mil. Nr.	0	1	1	0	0	2	8	9
Credit subsidy	Mil. Nr.	0	0	0	0	0	0	0	1
Marketing board	Mil. Nr.	4	4	7	3	9	NA	NA	NA
Foreign exchange	Mil. Nr.	-5	-7	-13	-4	-5	1	-11	-19
Border controls	Mil. Nr.	NA	NA	NA	NA	NA	22	120	163
Total policy transfers	Mil. Nr.	-1	-3	-5	-1	5	25	118	154
PSE (per unit value)	Percent	-13	-36	-45	-28	42	65	74	61
PSE (per unit quantity)	Nr./ton	-35	-101	-178	-126	334	839	2,357	2,566
	US$/ton	-52	-139	-234	-141	248	209	526	349
Rice:									
Level of production	1,000 ton	583	614	647	682	632	552	554	599
Producer price	Nr./ton	730	575	883	1,040	1,094	1,311	2,110	3,161
Value to producers	Mil. Nr.	426	353	571	709	691	724	1,169	1,893
Policy transfers to producers--									
Tariff	Mil. Nr.	15	64	105	112	35	NA	NA	NA
Fertilizer subsidy	Mil. Nr.	7	12	14	17	19	52	72	70
Credit subsidy	Mil. Nr.	1	1	2	2	1	1	2	4
Foreign exchange	Mil. Nr.	-230	-312	-538	-477	-369	46	-261	-385
Nontariff border controls	Mil. Nr.	797	448	872	1,043	1,113	163	637	162
Total policy transfers	Mil. Nr.	590	213	455	697	800	262	450	-149
PSE (per unit value)	Percent	139	60	80	98	116	36	38	-8
PSE (per unit quantity)	Nr./ton	1,013	348	704	1,022	1,266	475	812	-249
	US$/ton	1,504	480	921	1,145	939	118	181	-34
Sugar:									
Level of production	1,000 ton	54	58	55	69	40	59	50	50
Producer price	Nr./ton	152	164	107	97	218	726	1,224	2,525
Value to producers	Mil. Nr.	8	10	6	7	9	43	61	126
Policy transfers to producers--									
Tariff	Mil. Nr.	1	2	2	2	1	13	31	63
Fertilizer subsidy	Mil. Nr.	0	1	1	0	1	1	2	2
Credit subsidy	Mil. Nr.	0	0	0	0	0	0	0	0
Foreign exchange	Mil. Nr.	-13	-19	-19	-19	-14	3	-16	-26
Total policy transfers	Mil. Nr.	-11	-16	-17	-16	-12	17	16	39
PSE (per unit value)	Percent	-138	-167	-289	-241	-137	40	27	31
PSE (per unit quantity)	Nr./ton	-209	-274	-308	-234	-298	294	327	778
	US$/ton	-310	-379	-403	-262	-221	73	73	106
Cotton (lint):									
Level of production	1,000 ton	20	13	15	10	28	27	29	26
Producer price	Nr./ton	1,275	1,400	1,750	2,125	2,500	10,000	11,250	14,000
Value to producers	Mil. Nr.	25	18	26	21	70	270	324	358
Policy transfers to producers--									
Fertilizer subsidy	Mil. Nr.	5	6	7	9	14	38	56	62
Credit subsidy	Mil. Nr.	0	0	0	0	0	0	1	1
Marketing board	Mil. Nr.	-8	-1	-1	-1	2	0	0	0
Foreign exchange	Mil. Nr.	-39	-28	-68	-49	-90	14	-84	-120
Tariff	Mil. Nr.	8	5	7	4	11	124	187	344
Total policy transfers	Mil. Nr.	-34	-17	-55	-36	-63	176	160	287
PSE (per unit value)	Percent	-136	-99	-210	-171	-90	65	49	80
PSE (per unit quantity)	Nr./ton	-1,730	-1,387	-3,678	-3,638	-2,253	6,537	5,554	11,212
	US$/ton	-2,569	-1,917	-4,815	-4,079	-1,672	1,632	1,239	1,524
Corn (white):									
Level of production	1,000 ton	1,785	1,660	1,800	2,000	2,000	1,900	2,200	1,900
Producer price	Nr./ton	691	767	1,090	795	714	611	1,891	2,735
Value to producers	Mil. Nr.	1,233	1,273	1,962	1,590	1,428	1,161	4,160	5,197
Policy transfers to producers--									
Fertilizer subsidy	Mil. Nr.	17	24	28	32	40	96	146	128
Credit subsidy	Mil. Nr.	4	5	7	5	3	2	8	10
Total policy transfers	Mil. Nr.	21	28	35	36	43	97	154	138
PSE (per unit value)	Percent	2	2	2	2	3	8	4	3
PSE (per unit quantity)	Nr./ton	12	17	19	18	22	51	70	73
	US$/ton	18	24	25	20	16	13	16	10

See footnotes at end of table.   Continued--

Table 2--Nigeria: Producer subsidy equivalents by commodity--Continued

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Cocoa:									
Level of production	1,000 ton	156	140	150	110	123	105	230	256
Producer price	Nr./ton	1,300	1,300	1,425	1,500	3,500	7,500	11,000	11,000
Value to producers	Mil. Nr.	203	182	214	165	431	788	2,530	2,816
Policy transfers to producers--									
Pesticide subsidy	Mil. Nr.	4	4	6	3	5	4	12	6
Credit subsidy	Mil. Nr.	1	1	1	1	1	1	5	6
Marketing board	Mil. Nr.	35	13	-38	-40	138	NA	NA	NA
Foreign exchange	Mil. Nr.	-320	-401	-977	-659	-600	62	-473	-529
Total policy transfers	Mil. Nr.	-281	-383	-1,008	-696	-456	67	-456	-517
PSE (per unit value)	Percent	-138	-211	-472	-422	-106	9	-18	-18
PSE (per unit quantity)	Nr./ton	-1,800	-2,739	-6,722	-6,323	-3,704	640	-1,984	-2,020
	US$/ton	-2,672	-3,785	-8,799	-7,088	-2,749	160	-443	-274

Nr. = Naira.
NA = Not applicable.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

port has been high since 1986, especially as a percentage of wheat value, but the crop is too small to account for a large proportion of the transfers within the agricultural sector.

Among the crops studied here, the taxing effect on cocoa was most important. This effect was largest both in terms of naira transferred and as a proportion of producer revenue. Until the marketing board was abolished, the effective net tax on cocoa producers was typically two or three times the revenue received. During the 8 years studied, the taxing effect was greatest in 1984 and nearly as high in 1985.

While this net taxation is large compared with that on other Nigerian commodities, the tax is comparable with the taxation on cocoa in other producing nations. Thus, the taxation on cocoa hurt Nigeria's international competitiveness compared with unilateral liberalization of government intervention in cocoa, but it had little effect on international competitiveness compared with a liberalized global market in cocoa. As other countries liberalize their cocoa sectors as part of their own structural adjustment or similar policy reform programs, Nigeria's market share is unlikely to improve. A model of the global cocoa market found that complete multilateral liberalization of cocoa would result in Nigeria maintaining market share but losing export revenue as prices fall (6).

Since cocoa is the only large export crop, most other cash crops serve for import substitution. PSE's were calculated for sugar and cotton with similar patterns of government intervention. Sugar was taxed the more heavily, but both were taxed in all years until 1987. For both crops, the major source of taxation was through the overvalued currency. For both crops, tariffs became relatively important in 1987, accounting for most of the subsidization experienced since then.

Corn was affected relatively little by government policy. Corn grown in Nigeria is usually white corn, used for direct human consumption. It does not compete with the yellow corn formerly imported by Nigeria for use as feed, especially

for poultry. Thus the border measures that are important in altering the prices of tradable commodities have no direct effect on Nigerian corn producers. The most important effects of government intervention for corn producers have been the subsidized inputs, mainly fertilizer. Levels of support ranged from 1.7 to 8.4 percent of producer revenue.

Rice production, in contrast, has been substantially supported most years since 1982 (fig. 1). Despite the taxing ef-

Figure 1

Nigeria: Rice producer subsidy equivalent

Percent

Nontariff border control   Foreign exchange   Tariff   Total
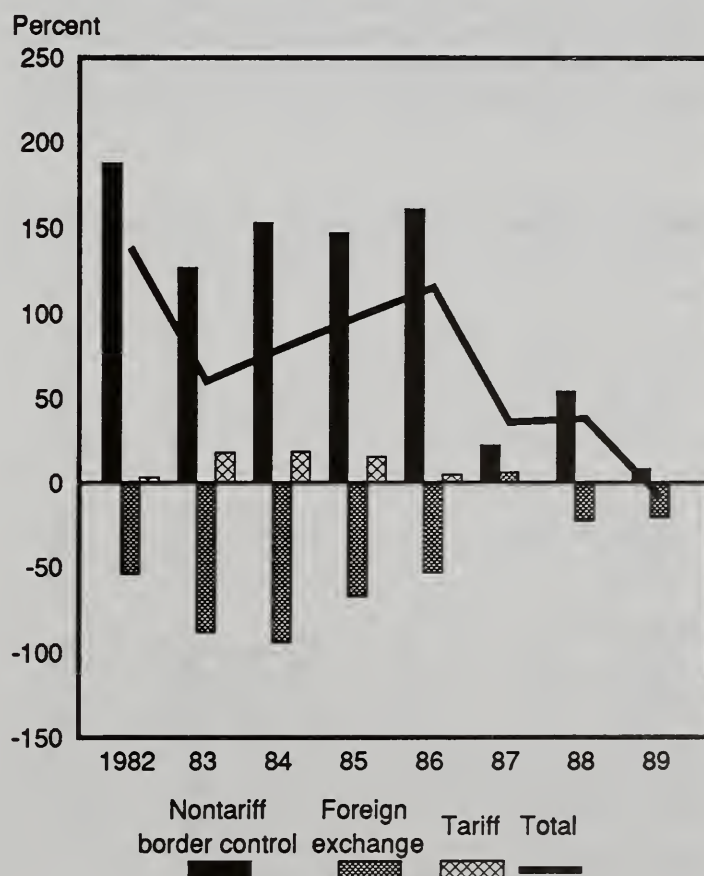
fect of the overvalued naira, direct border controls have been sufficient to result in net subsidies. This rate of subsidy is probably the highest for any large crop in Nigeria, but the rate is less than that given to rice producers in many other nations. The pattern of government support is globally highest for import substitution crops, like rice in Nigeria. Japan subsidizes its rice production at rates generally over 100 percent of the producer value, and the United States, at levels only slightly below Nigeria's (10).

Nigerian border measures consisted mainly of import licensing before 1986 and of the import ban since 1986. These measures restricted imports enough to raise the producer price in Nigeria. Tariffs on rice imports raised the domestic price further while generating government revenue, but the effect was less than that of the quantitative controls. Precise determination of the price shift due to these measures is complicated by the differences in quality between imported rices and Nigerian rice. Nigeria shifted from relatively high-quality U.S. rice to Thai rice in the early 1980's. The Nigerian rice sells for a lower price than the imported varieties.

Various subsidies were also provided to rice producers, although the total subsidy value was much less than the value of higher prices for output. Irrigation schemes were particularly designed to benefit rice producers. The benefits of the large irrigation projects are difficult to assess or to assign to particular years, and no attempt is made here to value them. Most rice production, however, uses small-scale technology.

Wheat is relatively new in the Nigerian diet, becoming popular during the import boom that came with high oil revenues. Wheat production in Nigeria is greatly hindered by the warm climate. Nonetheless, Nigerians strongly prefer wheat bread. The marketing board supported wheat prices at a level insufficient to fully offset the effects of currency overvaluation.

The ban on wheat imports, however, coupled with the reduced overvaluation, has resulted in large subsidization rates for wheat production. Although wheat production is subsidized in many countries, including the major exporters, the recent Nigerian subsidy levels of over 50 percent of producer revenue are considerably higher than is typical elsewhere (10).

Production levels for wheat in recent years are especially difficult to measure because of the incentive to smuggle wheat and sell it as grown in Nigeria. The import figures of Nigeria's neighbors show evidence that significant trade of wheat has continued to flow into Nigeria despite the ban. The price of wheat bread has risen with the ban, but this bread remains available in quantities difficult to justify on the basis of domestic production capacity.

Results by Policy

Of the seven policies studied for effects on producers, the heavy taxing effect of foreign exchange controls was the most important in all years except 1987. The subsidies resulting from nontariff border controls, mainly import bans and licensing, were large but did not offset the effect of the overvaluation of foreign exchange. Commodity boards were often important to specific commodities, but their overall effect was less because some boards taxed while others subsidized. The various input subsidies were relatively unimportant to producer revenue.

Results for Consumers

For the commodities here studied, transfers to consumers as a result of government policy ranged from taxation of 28 percent of consumer cost in 1987 to a maximum subsidy rate of 30 percent in 1983 (table 3). Consumers were subsidized in 1982-84 but have been taxed since that time.

Table 3--Nigeria: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Tariff	Mil. Nr.	-70	-166	-220	-232	-119	-701	-1,131	-1,857
Foreign exchange	Mil. Nr.	995	1,305	2,023	1,838	1,306	-157	652	930
Nontariff border policy	Mil. Nr.	-667	-648	-1,289	-1,829	-1,300	-72	-500	-301
Policy transfers by commodity:									
Wheat	Mil. Nr.	265	315	704	695	279	-277	-568	-780
Rice (milled)	Mil. Nr.	-249	-131	-587	-1,277	-788	-152	-144	212
Sugar	Mil. Nr.	196	240	151	137	185	-158	-163	-436
Cotton	Mil. Nr.	46	68	245	222	212	-342	-103	-224
CSE by crop:									
Wheat	Percent	143	184	321	267	146	-134	-277	-161
Rice (milled)	Percent	-21	-10	-31	-51	-41	-7	-6	6
Sugar	Percent	144	175	302	247	145	-36	-25	-34
Cotton	Percent	121	162	299	252	139	-67	-33	-39
Total policy transfers	Mil. Nr.	258	492	513	-223	-112	-929	-979	-1,228
Cost to consumers	Mil. Nr.	1,524	1,606	2,247	2,885	2,378	3,310	3,551	6,132
Total commodity CSE	Percent	16.9	30.6	22.8	-7.7	-4.7	-28.1	-27.6	-20.0

Nr. = Naira.
CSE = Consumer subsidy equivalent.

Results by Commodity

The crops that are important to consumer subsidy levels differ from those that are important to producer subsidies (table 4). Wheat has been a major import but not a major product. Sugar has also been considerably more important as an import item. The corn that is produced is different from that which was imported.

Among the crops studied, rice consumption was taxed most consistently (fig. 2). Rice prices were controlled at levels that did not vary with international markets. Net taxes on other consumers did not occur until foreign exchange controls were relaxed in 1987. Of the commodities studied, wheat received the greatest measured effect from government activity. Wheat consumers were subsidized during 1982-86, averaging 212 percent of the crop cost. They were taxed during 1987-89, at an average of 191 percent of crop cost.

Results by Policy

Consumer subsidy equivalents (CSE's) were calculated for tariffs, foreign exchange controls, and other border measures, mainly import licensing. Until 1987, the most important border measure to affect agricultural consumers was the control of foreign exchange. This control was large enough to offset

Table 4—Nigeria: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 ton	1,432	1,257	1,565	1,638	1,001	362	259	325
Wholesale price	Nr./ton	129	136	140	159	192	573	793	1,488
Cost to consumers	Mil. Nr.	185	171	219	261	192	207	205	484
Policy transfers to consumers--									
Border controls	Mil. Nr.	-19.3	-18.7	-23.7	-27.4	-24.8	-263.2	-623.5	-881.5
Foreign exchange	Mil. Nr.	284	334	727	723	304	-14	55	101
Total policy transfers	Mil. Nr.	265	315	704	695	279	-277	-568	-780
CSE (per unit value)	Percent	143	184	321	267	146	-134	-277	-161
CSE (per unit quantity)	Nr./ton	185	251	450	425	279	-766	-2,195	-2,400
	US$/ton	275	346	589	476	207	-191	-490	-326
Rice:									
Level of consumption	1,000 ton	969	1,015	950	1,014	802	899	567	603
Retail price	Nr./ton	1,202	1,237	1,996	2,447	2,376	2,400	4,219	6,322
Cost to consumers	Mil. Nr.	1,165	1,256	1,896	2,481	1,906	2,158	2,392	3,812
Policy transfers to consumers--									
Tariff	Mil. Nr.	-25	-106	-155	-166	-44	NA	NA	NA
Foreign exchange	Mil. Nr.	443	623	857	718	556	-80	356	513
Nontariff border policy	Mil. Nr.	-667	-648	-1,289	-1,829	-1,300	-72	-500	-301
Total policy transfers	Mil. Nr.	-249	-131	-587	-1,277	-788	-152	-144	212
CSE (per unit value)	Percent	-21	-10	-31	-51	-41	-7	-6	6
CSE (per unit quantity)	Nr./ton	-257	-129	-618	-1,259	-983	-169	-253	351
	US$/ton	-382	-178	-808	-1,412	-729	-42	-57	48
Sugar:									
Level of consumption	1,000 ton	899	835	468	569	585	597	525	500
Retail price	Nr./ton	152	164	107	97	218	726	1,224	2,525
Cost to consumers	Mil. Nr.	136	137	50	55	128	433	642	1,263
Policy transfers to consumers--									
Tariff	Mil. Nr.	-14	-27	-15	-17	-19	-130	-321	-631
Foreign exchange	Mil. Nr.	209	267	166	153	204	-28	158	196
Total policy transfers	Mil. Nr.	196	240	151	137	185	-158	-163	-436
CSE (per unit value)	Percent	144	175	302	247	145	-36	-25	-34
CSE (per unit quantity)	Nr./ton	218	287	322	240	316	-265	-311	-871
	US$/ton	323	397	421	269	235	-66	-69	-118
Cotton (lint):									
Level of consumption	1,000 ton	30	38	60	50	75	67	29	26
Wholesale price	Nr./ton	1,279	1,120	1,368	1,757	2,037	7,645	10,801	22,393
Cost to consumers	Mil. Nr.	38	42	82	88	153	512	311	573
Policy transfers to consumers--									
Tariff	Mil. Nr.	-13	-14	-27	-22	-31	-307	-187	-344
Foreign exchange	Mil. Nr.	59	82	272	244	242	-35	84	120
Total policy transfers	Mil. Nr.	46	68	245	222	212	-342	-103	-224
CSE (per unit value)	Percent	121	162	299	252	139	-67	-33	-39
CSE (per unit quantity)	Nr./ton	1,544	1,814	4,088	4,437	2,823	-5,111	-3,579	-8,742
	US$/ton	2,293	2,508	5,351	4,973	2,095	-1,276	-799	-1,188

Nr. = Naira.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.
NA= not applicable.

the taxing effects of other border measures until 1985 and resulted in a net subsidy from all policies. The rise in importance of import licensing, with its effect of raising prices, was sufficient by 1985 to result in net taxation of consumers for the commodities studied. As with producer subsidies, the consumer subsidy measures show an abrupt change in pattern with the start of the structural adjustment program. The effects of both previously important policies were much reduced, leaving tariffs responsible for most of the remaining policy effect. Taxation rates were at record highs (in percentage terms) for the 2 years of 1987 and 1988, until the increasing overvaluation of the naira again nearly offset tariffs and import bans in 1989.

Conclusions

The policy levels measured here demonstrate the disincentive to several forms of crop production that resulted from government policies. The policies caused the most severe burden for cash crops. The policies also attest to the extensive liberalization undertaken in 1986. Some reversion to earlier patterns has occurred since 1986, but previous levels of intervention have not been matched. Despite liberalizations, grain imports remain constrained by trade policy.

The importance of exchange rate policy for tradable commodities is shown in this report, but price policy was some-

times even more important for specific commodities. Fertilizer policy is among the most important sources of transfers that are administered directly today, creating the greatest potential for bureaucratic problems. Most of the policy effects are concentrated on a few commodities that do not represent the bulk of production or consumption. The potential for increased production through further liberalization is limited.

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Figure 2
Nigeria: Rice consumer subsidy equivalent
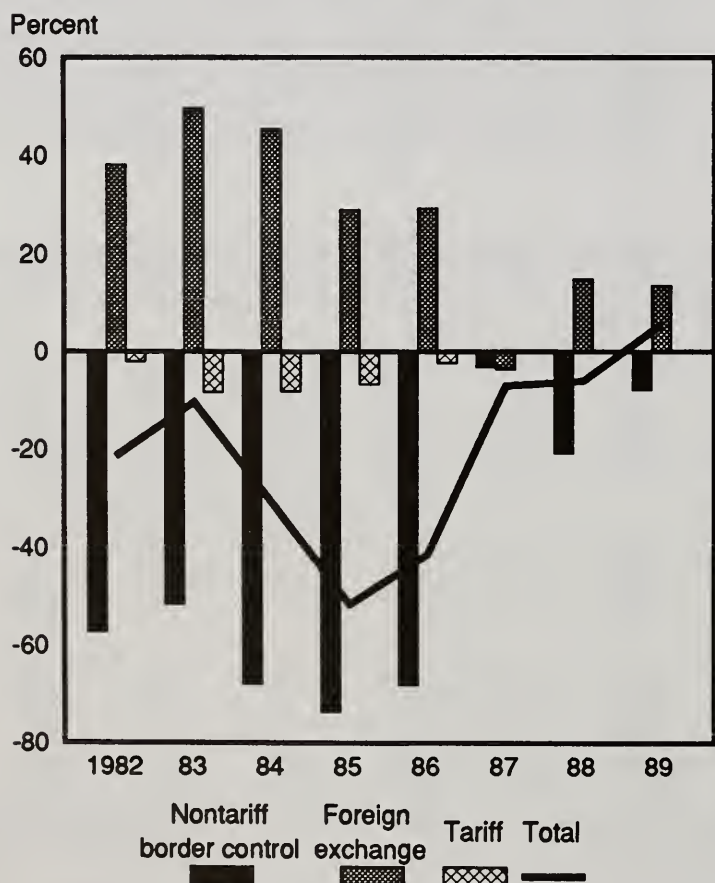
Appendix: Methodology

The major Nigerian sources of data on Nigerian agriculture are the Federal Office of Statistics (FOS) and the Central Bank of Nigeria. Other sources include the World Bank, the Food and Agriculture Organization of the United Nations (FAO), and the U.S. Department of Agriculture (USDA). Each of these regularly publishes time series on production and other agricultural variables, but these sources differ widely in their conclusions. FAO and USDA generally show the largest production numbers, while FOS typically has the smallest. FAO figures for poultry meat production, for example, are six times the level reported by the FOS. USDA estimates of rice production are often double FOS numbers, but USDA wheat estimates are considerably lower than FOS estimates.

These discrepancies reflect the paucity of systematic primary data and differing assumptions about population, nutritional status, and unofficial trade. The data, therefore, are especially poor at offering implications on nutrition levels or unofficial trade. This report relies principally on data from the Central Bank of Nigeria when such information is available. This source has had formal responsibility for monitoring producer prices through the Technical Committee on Agriculture, and it has been the most consistent in its procedures for compiling price estimates. Its production numbers may not be obviously superior to those of other sources, but its figures tend to be in the middle, rather than on the extremes, of the range of estimates and parallel the FOS numbers in most cases.

Pricing Policy

In cases where prices were directly controlled, the subsidy equivalent was calculated by comparing prices received by farmers with international prices and multiplying the difference by the quantity of production. Direct price control was implemented through marketing boards for some crops, although the marketing boards were ineffective in controlling the prices of those crops which, like corn, did not pass through a marketing bottleneck such as processing milk or a port for exportation.

The appropriate international price was often difficult to determine, since it varies according to the commodity under study. Adjustments were generally made to available price series to account for differences in quality and location between the local price and the international price. For example, the transportation cost for rice was added to the port price in Thailand. The transportation cost to Nigerian ports was added, but transportation costs within Nigeria were ignored. In the absence of government intervention, the farmgate price of rice would equal the import price if the transportation cost from the farmgate equals the transportation cost from the port. Quality was generally treated by using data for the closest quality for which an international price series was available, but further adjustment was done where price differences between domestic and imported commodities were observed. Unweighted average prices throughout the year were used to represent international prices because of the convenience of obtaining such prices, although prices during the harvest season might have been theoretically better justified.

Many of the problems of adjusting international prices can be eliminated by using import unit values (that is, by using the average cost of imports). Data on import unit values is available for commodities that were legally imported in substantial quantities.

Exchange Rate Policy

Determination of the equilibrium rate can be accomplished in various ways. The only published account of black market rates around the world indicates unofficial exchange rates during the 1980's that value the naira 10-15 percent less than the rates estimated in this report (2). A rigorous examination of the exchange rate would take account of the value of trade with Nigeria under various currencies. This was considered unlikely to yield more useful information than would viewing the exchange rate simply in dollar terms.

The procedure used here is based on the premise that the official and equilibrium exchange rates were equal in August 1987, the month following the unification of the two official foreign exchange markets. Overvaluation in other time periods is calculated by compensating for the inflation of the naira compared with the inflation of the dollar and the change in official exchange rates.

Tariffs

The subsidy equivalent for a tariff was calculated as the product of the tariff rate, the open-market price, and the quantity of production. Tariffs were only measured as subsidies for commodities that were imported in substantial quantities.

Nontariff Border Controls

For several commodities during some or all of the period studied, border controls existed, of which the effect could not be directly measured. Controls like licensing of imports and bans of imports tended to raise domestic prices. The effect of such policies was determined by comparing international prices with domestic prices in a fashion analogous to the procedure used to measure the effect of price policies. Part of the price difference, however, could, in some cases, be attributed to tariffs, and the value of the tariff subsidy was subtracted from the subsidy total to reveal the nontariff border control effect.

Input Policy

Credit subsidies were measured by comparing interest rates in the nonagricultural sector with agricultural interest rates and multiplying the difference by the amount of credit assumed in the production of each crop. Credit was allocated among crops according to the proportion of agricultural value in the crop.

Fertilizer and pesticide subsidies were reported in government statistics. All pesticide subsidies were allocated to cocoa producers. Fertilizer was allocated to crops according to the proportion of all cropland area used in production of the crop.

Appendix table 1--Wheat: Calculation of Nigeria's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	12	14	16	5	7	15	40	50
B. Production	1,000 tons	26	26	27	10	15	30	50	60
C. Producer price	Nr./ton	280	280	400	450	800	1,300	3,200	4,200
D. Producer value (B*C)/1,000	Mil. Nr.	7	7	11	5	12	39	160	252
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price	Nr./ton	280	280	400	450	800	NA	NA	NA
b. Border price, U.S. export unit value	US$/ton	192	188	183	178	142	NA	NA	NA
c. Border price, U.S. export unit value	Nr./ton	129	136	140	159	192	NA	NA	NA
d. Price support (1a-1c)*B/1,000	Mil. Nr.	4	4	7	3	9	NA	NA	NA
2. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.5	1.4	1.3	1.1	0.7	0.2	0.2	0.1
b. Equilibrium exchange rate	US$/Nr.	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.1
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy -1c*2c*B/100,000	Mil. Nr.	-5.2	-6.9	-12.5	-4.4	-4.6	1.2	-10.6	-18.7
3. Fertilizer transfers--									
a. Wheat share of land	Percent	0.06	0.07	0.08	0.02	0.03	0.06	0.16	0.20
b. Application rate	Percent	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
c. Fertilizer subsidy	Mil. Nr.	135	191	219	267	352	874	1214	1167
d. Fertilizer PSE (3a/3.88)*3b*3c	Mil. Nr.	0.31	0.52	0.67	0.23	0.41	2.12	7.84	9.42
4. Credit policy--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/4a)*4b	Mil. Nr.	0.02	0.03	0.04	0.01	0.03	0.06	0.29	0.50
5. Border controls--									
a. Producer price	Nr./ton	NA	NA	NA	NA	NA	1,300	3,200	4,200
b. Border price, U.S. export unit value	US$/ton	NA	NA	NA	NA	NA	143	177	202
c. Border price, U.S. export unit value	Nr./ton	NA	NA	NA	NA	NA	573	793	1,488
d. Price support (1a-1c)*B/1,000	Mil. Nr.	NA	NA	NA	NA	NA	21.8	120.4	162.7
F. Total transfers to producers:									
1. Total (1d+2d+3d+4c+5d)	Mil. Nr.	-0.9	-2.6	-4.8	-1.3	5.0	25.2	117.9	153.9
2. Producer subsidy equivalents (F1/D)*100	Percent	-12.5	-35.9	-44.6	-27.9	41.7	64.5	73.7	61.1
G. Consumption	1,000 tons	1,432	1,257	1,565	1,638	1,001	362	259	325
H. Retail price	Nr./ton	280	280	400	450	800	1,300	3,200	4,200
I. Consumer cost (G*H)/1,000	Mil. Nr.	401	352	626	737	801	471	829	1,365
J. Policy transfers to consumers:									
1. Import ban policy--									
a. Border price, U.S. export unit value	Nr./ton	NA	NA	NA	NA	NA	573	793	1,488
b. Retail price	Nr./ton	NA	NA	NA	NA	NA	1,300	3,200	4,200
c. Import ban CSE (1a-1b)*G/1,000	Mil. Nr.	NA	NA	NA	NA	NA	-263	-624	-881
2. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.5	1.4	1.3	1.1	0.7	0.2	0.2	0.1
b. Equilibrium exchange rate	US$/Nr.	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.1
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy (2c*1a)*G/100,000	Mil. Nr.	284	334	727	723	304	-14	55	101
3. Tariff--									
a. Border price	Nr./ton	129	136	140	159	192	NA	NA	NA
b. Imports	1,000 tons	1,492	1,370	1,693	1,723	1,295	NA	NA	NA
c. Tariff rate	Ratio	0.1	0.1	0.1	0.1	0.1	NA	NA	NA
d. Tariff subsidy -(3c*3a*3b)/1,000	Mil. Nr.	-19.3	-18.7	-23.7	-27.4	-24.8	NA	NA	NA
K. Total transfers to consumers:									
1. Total (1c+2d+3d)	Mil. Nr.	265	315	704	695	279	-277	-568	-780
2. CSE (K1/((G*1a)/1,000))*100	Percent	143	184	321	267	146	-134	-277	-161

ha. — Hectare.
Nr. — Naira.
NA — Not applicable because of import ban.
US$ — U.S. dollar.
PSE — Producer subsidy equivalent.
CSE — Consumer subsidy equivalent.

Appendix table 2--Rice: Calculation of Nigeria's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	500	530	570	610	560	630	635	640
B. Production	1,000 tons	583	614	647	682	632	552	554	599
C. Producer price	Nr./ton	730	575	883	1,040	1,094	1,311	2,110	3,161
D. Producer value (B*C)/1,000	Mil. Nr.	426	353	571	709	691	724	1,169	1,893
E. Policy transfers to producers:									
1. Nontariff border controls--									
a. Producer price	Nr./ton	730	575	883	1,040	1,094	1,311	2,110	3,161
b. Border price, Thai plus transportation (30%)	US$/ton	381	360	328	283	273	305	392	416
c. Border price, Thai	Nr./ton	257	260	251	252	368	1,221	1,757	3,064
d. Price support ((1a-1c)*B/1,000)-5c	Mil. Nr.	261	129	304	426	424	50	195	58
2. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1	1	1	1	1	0	0	0
b. Equilibrium exchange rate	US$/Nr.	1	0	0	0	0	0	0	0
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy -1c*2c*B/100,000	Mil. Nr.	-230	-312	-538	-477	-369	46	-261	-385
3. Fertilizer transfers--									
a. Rice share of land	Percent	2	3	3	3	2	3	3	3
b. Application rate	Percent	6	6	6	6	6	6	6	6
c. Fertilizer subsidy	Mil. Nr.	135	191	219	267	352	874	1,214	1,167
d. Fertilizer PSE (3a/249.95)*3b*3c	Mil. Nr.	7	12	14	17	19	52	72	70
4. Credit policy--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/4a)*4b	Mil. Nr.	1	1	2	2	1	1	2	4
5. Tariff--									
a. Tariff	Percent	10	40	65	65	15	NA	NA	NA
b. Border price, Thai	Nr./ton	257	260	251	252	368	NA	NA	NA
c. Tariff PSE (5a/100)*5b*B/1,000	Mil. Nr.	15	64	105	112	35	NA	NA	NA
F. Total transfers to producers:									
1. Total (1d+2d+3d+4c+5c)	Mil. Nr.	55	-106	-113	79	110	149	8	-253
2. Producer subsidy equivalents (F1/D)*100	Percent	13	-30	-20	11	16	21	1	-13
G. Consumption	1,000 tons	969	1,015	950	1,014	802	899	567	603
H. Retail price	Nr./ton	1,202	1,237	1,996	2,447	2,376	2,400	4,219	6,322
I. Consumer cost (G*H)/1,000	Mil. Nr.	1,165	1,256	1,896	2,481	1,906	2,158	2,392	3,812
J. Policy transfers to consumers:									
1. Nontariff border controls--									
a. Border price, Thai plus transportation (30%)	Nr./ton	257	260	251	252	368	1,221	1,757	3,064
b. Retail price	Nr./ton	1,202	1,237	1,996	2,447	2,376	2,400	4,219	6,322
c. Nontariff CSE (((1a*1.9)-1b)*G/1,000)-3c	Mil. Nr.	-667	-648	-1,289	-1,829	-1,300	-72	-500	-301
2. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1	1	1	1	1	0	0	0
b. Equilibrium exchange rate	US$/Nr.	1	0	0	0	0	0	0	0
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy (2c*1a)*G/100,000	Mil. Nr.	443	623	857	718	556	-80	356	513
3. Tariff--									
a. Tariff	Percent	10	40	65	65	15	NA	NA	NA
b. Border price, Thai plus transportation (30%)	Nr./ton	257	260	251	252	368	NA	NA	NA
c. Tariff CSE -(3a/100)*3b*G/1,000	Mil. Nr.	-25	-106	-155	-166	-44	NA	NA	NA
K. Total transfers to consumers:									
1. Total (1c+2d+3c)	Mil. Nr.	-249	-131	-587	-1,277	-788	-152	-144	212
2. CSE (K1/I)*100	Percent	-21	-10	-31	-51	-41	-7	-6	6

ha. — Hectare.
Nr. — Naira.
US$ — U.S. dollar.
NA — Not applicable because of import ban.
PSE — Producer subsidy equivalent.
CSE — Consumer subsidy equivalent.

Appendix table 3—Corn: Calculation of Nigeria's producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	1,970	1,890	1,975	2,000	2,000	2,000	2,200	2,000
B. Production	1,000 tons	1,785	1,660	1,800	2,000	2,000	1,900	2,200	1,900
C. Producer price	Nr./ton	691	767	1,090	795	714	611	1,891	2,735
D. Producer value (B*C)/1,000	Mil. Nr.	1,233	1,273	1,962	1,590	1,428	1,161	4,160	5,197
E. Policy transfers to producers:									
1. Credit--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/4a)*4b	Mil. Nr.	4	5	7	5	3	2	8	10
2. Fertilizer transfers--									
a. Corn share of land	Percent	9.31	9.15	9.39	8.65	8.33	8.00	8.80	8.00
b. Application rate	Percent	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55
c. Fertilizer subsidy	Mil. Nr.	135	191	219	267	352	874	1,214	1,167
d. Fertilizer PSE (3a/479.16)*3b*3c	Mil. Nr.	17.2	23.9	28.2	31.5	40.1	95.6	146.0	127.6
F. Total transfers to producers:									
1. Total (1c+2d)	Mil. Nr.	21	28	35	36	43	97	154	138
2. Producer subsidy equivalents (F1/D)*100	Percent	1.7	2.2	1.8	2.3	3.0	8.4	3.7	2.7

ha. — Hectare.
Nr. — Naira.
PSE — Producer subsidy equivalent.

Appendix table 4—Sugar: Calculation of Nigeria's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	20	22	20	10	11	12	12	12
B. Production	1,000 tons	54	58	55	69	40	59	50	50
C. Producer price	Nr./ton	167	197	139	126	251	943	1,836	3,788
D. Producer value (B*C)/1,000	Mil. Nr.	9	11	8	9	10	56	92	189
E. Policy transfers to producers:									
1. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.5	1.4	1.3	1.1	0.7	0.2	0.2	0.1
b. Equilibrium exchange rate	US$/Nr.	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.1
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy -4b*1c*B/100,000	Mil. Nr.	-12.6	-18.5	-19.5	-18.6	-13.8	2.9	-16.4	-26.5
2. Fertilizer transfers--									
a. Sugar share of land	Percent	0.09	0.11	0.10	0.04	0.05	0.05	0.05	0.05
b. Application rate	Percent	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
c. Fertilizer subsidy	Mil. Nr.	135	191	219	267	352	874	1214	1167
d. Fertilizer PSE (2a/50.5)*2b*2c	Mil. Nr.	0.45	0.72	0.74	0.41	0.57	1.48	2.06	1.98
3. Credit policy--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/3a)*3b	Mil. Nr.	0.03	0.04	0.03	0.03	0.02	0.09	0.17	0.38
4. Tariff--									
a. Tariff	Percent	10	20	30	30	15	30	50	50
b. Border price, Caribbean	Nr./ton	152	164	107	97	218	726	1,224	2,525
c. Tariff PSE (4a/100)*4b*B/1,000	Mil. Nr.	1	2	2	2	1	13	31	63
F. Total transfers to producers:									
1. Total (1d+2d+3c+4c)	Mil. Nr.	-11	-16	-17	-16	-12	17	16	39
2. Producer subsidy equivalent (F1/D)*100	Percent	-125	-139	-222	-185	-119	31	18	21
G. Consumption	1,000 tons	899	835	468	569	585	597	525	500
H. Retail price	Nr./ton	152	164	107	97	218	726	1,224	2,525
I. Consumer cost (G*H)/1,000	Mil. Nr.	136	137	50	55	128	433	642	1,263
J. Policy transfers to consumers:									
1. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.49	1.38	1.31	1.12	0.74	0.25	0.22	0.14
b. Equilibrium exchange rate	US$/Nr.	0.59	0.47	0.30	0.30	0.29	0.27	0.18	0.11
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy (1c*2b)*G/100,000	Mil. Nr.	209	267	166	153	204	-28	158	196
2. Tariff--									
a. Tariff	Percent	10	20	30	30	15	30	50	50
b. Border price, Caribbean	Nr./ton	152	164	107	97	218	726	1,224	2,525
c. Tariff CSE -(2a/100)*2b*G/1,000	Mil. Nr.	-14	-27	-15	-17	-19	-130	-321	-631
K. Total transfers to consumers:									
1. Total (1d+2c)	Mil. Nr.	196	240	151	137	185	-158	-163	-436
2. Consumer subsidy equivalent (K1/I)*100	Percent	144	175	302	247	145	-36	-25	-34

ha. = Hectare.
Nr. = Naira.
US$ = U.S. dollar.
PSE = Producer subsidy equivalent.

Appendix table 5—Cotton lint: Calculation of Nigeria's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	215	205	200	220	285	320	340	390
B. Production	1,000 tons	20	13	15	10	28	27	29	26
C. Producer price	Nr./ton	1,275	1,400	1,750	2,125	2,500	10,000	11,250	14,000
D. Producer value (B*C)/1,000	Mil. Nr.	25	18	26	21	70	270	324	358
E. Policy transfers to producers:									
1. Nontariff border controls--									
a. Producer price	Nr./ton	1,275	1,400	1,750	2,125	2,500	10,000	11,250	14,000
b. Border price, import unit values	US$/ton	1,900	1,548	1,790	1,970	1,511	1,908	2,410	3,043
c. Border price, import unit values	Nr./ton	1,279	1,120	1,368	1,757	2,037	7,645	10,801	22,393
d. Price support ((1a-1c)*B/1,000)-5c	Mil. Nr.	-8	-1	-1	-1	2	0	0	0
2. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.49	1.38	1.31	1.12	0.74	0.25	0.22	0.14
b. Equilibrium exchange rate	US$/Nr.	0.59	0.47	0.30	0.30	0.29	0.27	0.18	0.11
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy -1c*2c*B/100,000	Mil. Nr.	-39	-28	-68	-49	-90	14	-84	-120
3. Fertilizer transfers--									
a. Cotton share of land	Percent	1.02	0.99	0.95	0.95	1.19	1.28	1.36	1.56
b. Application rate	Percent	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
c. Fertilizer subsidy	Mil. Nr.	135	191	219	267	352	874	1214	1167
d. Fertilizer PSE (3a/234.53)*3b*3c	Mil. Nr.	4.68	6.47	7.12	8.64	14.25	38.14	56.31	62.08
4. Credit policy--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/4a)*4b	Mil. Nr.	0.1	0.1	0.1	0.1	0.1	0.4	0.6	0.7
5. Tariff--									
a. Tariff	Percent	33	33	33	25	20	60	60	60
b. Border price, import unit values	Nr./ton	1,279	1,120	1,368	1,757	2,037	7,645	10,801	22,393
c. Tariff PSE (5a/100)*5b*B/1,000	Mil. Nr.	8	5	7	4	11	124	187	344
F. Total transfers to producers:									
1. Total (1d+2d+3d+4c+5c)	Mil. Nr.	-34	-17	-55	-36	-63	176	160	287
2. Producer subsidy equivalent (F1/D)*100	Percent	-135.7	-99.1	-210.2	-171.2	-90.1	65.4	49.4	80.1
G. Consumption	1,000 tons	29.8	37.6	60	50	75	67	28.8	25.6
H. Retail price	Nr./ton	1,279	1,120	1,368	1,757	2,037	7,645	10,801	22,393
I. Consumer cost (G*H)/1,000	Mil. Nr.	38	42	82	88	153	512	311	573
J. Policy transfers to consumers:									
1. Foreign exchange policy--									
a. Official exchange rate	US$/Nr.	1.49	1.38	1.31	1.12	0.74	0.25	0.22	0.14
b. Equilibrium exchange rate	US$/Nr.	0.59	0.47	0.30	0.30	0.29	0.27	0.18	0.11
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy (1c*2b)*G/100,000	Mil. Nr.	59	82	272	244	242	-35	84	120
2. Tariff--									
a. Tariff	Percent	33	33	33	25	20	60	60	60
b. Border price, Thai plus transportation (30%)	Nr./ton	1,279	1,120	1,368	1,757	2,037	7,645	10,801	22,393
c. Tariff CSE -(2a/100)*2b*G/1,000	Mil. Nr.	-13	-14	-27	-22	-31	-307	-187	-344
K. Total transfers to consumers:									
1. Total (1d+2c)	Mil. Nr.	46	68	245	222	212	-342	-103	-224
2. Consumer subsidy equivalent (K1/I)*100	Percent	121	162	299	252	139	-67	-33	-39

ha. — Hectare.
Nr. — Naira.
US$ — U.S. dollar.
PSE — Producer subsidy equivalent.
CSE — Consumer subsidy equivalent.

Appendix table 6—Cocoa: Calculation of Nigeria's producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	700	700	700	700	700	700	700	700
B. Production	1,000 tons	156	140	150	110	123	105	230	256
C. Producer price	Nr./ton	1,300	1,300	1,425	1,500	3,500	7,500	11,000	11,000
D. Producer value (B*C)/1,000	Mil. Nr.	203	182	214	165	431	788	2,530	2,816
E. Policy transfers to producers:									
1. Marketing board--									
a. Producer price, including marketing costs	Nr./ton	1,560	1,560	1,710	1,800	4,200	NA	NA	NA
b. Border price, export unit value	US$/ton	1,983	2,031	2,569	2,422	2,281	NA	NA	NA
c. Border price, export unit value	Nr./ton	1,335	1,470	1,963	2,161	3,074	NA	NA	NA
d. Price support (1a-1c)*B/1,000	Mil. Nr.	35.04	12.65	-37.89	-39.66	138.48	NA	NA	NA
2. Foreign exchange policy--									
a. Official exchange rate	Nr/U.S.$	1.49	1.38	1.31	1.12	0.74	0.25	0.22	0.14
b. Equilibrium exchange rate	Nr/U.S.$	0.59	0.47	0.30	0.30	0.29	0.27	0.18	0.11
c. Overvaluation	Percent	154	195	332	277	159	-7	27	21
d. Foreign exchange subsidy -2c*1c*B/100,000	Mil. Nr.	-320	-401	-977	-659	-600	62	-473	-529
3. Credit--									
a. Value, all agriculture	Mil. Nr.	10,622	12,145	18,116	20,835	31,928	44,859	56,170	64,903
b. Credit, all agriculture	Mil. Nr.	35	43	60	64	67	74	102	130
c. Credit support ((B*C/1,000)/3a)*3b	Mil. Nr.	1	1	1	1	1	1	5	6
4. Pesticide transfers--									
a. Pesticide transfers	Mil. Nr.	3.7	4.4	6.0	3.1	4.7	3.8	12.1	6.3
F. Total transfers to producers:									
1. Total (1d+2d+3c+4a)	Mil. Nr.	-281	-383	-1008	-696	-456	67	-456	-517
2. Producer subsidy equivalents (F1/D)*100	Percent	-138	-211	-472	-422	-106	9	-18	-18

ha. = Hectare.
Nr. = Naira.
NA = Not applicable because of import ban.
US$ = U.S. dollar.

Senegal

By Margaret Missiaen

Economic and Agricultural Developments

Senegal was one of a number of African countries that opted for "African socialism"at independence in 1960. This political theory supposed that the state, and especially an enlightened bureaucracy, would manage the economy for the benefit of all its citizens. This philosophy translated into extensive price controls, subsidies, and state owned and managed industry. These general policies were in effect in Senegal from 1960 through 1983, when the first real attempts at structural adjustment began. Extensive state disengagement and general economic liberalization have characterized the period following 1983 (8).[1]

Adjustment of the Senegalese economy became unavoidable at the end of the 1970's, when a combination of poor financial and economic policies plunged an already weak economy into a severe crisis. The Government recognized the shortcomings of its overly ambitious development plans and nationalization policies that were launched following the short-lived boom in peanut and phosphate export earnings in the mid-1970's. Reform efforts then aimed at reestablishing a viable balance of payments, promoting private investment in agriculture and industry, and achieving greater efficiency in the management of public sector resources (13).

These policy reforms, assisted by some increases in agricultural output in years of favorable weather, have contributed to noticeable economic improvement. Between 1985 and 1990, real gross domestic product (GDP) grew at an average rate of 3 percent, despite drought in 1988 and 1990. This increase compares with a long-term economic growth trend of 2.5 percent and a population growth rate of 2.9 percent (13). The rate of inflation fell from 11 percent in 1983 to 2 percent in 1990, while the overall fiscal balance improved from a deficit of 6 percent of GDP in 1983 to a 1-percent surplus in 1990 (5).

From 1985 to 1988, GDP growth was driven principally by the strong performance of the agricultural sector, a product of favorable price incentives, particularly for peanuts, and years of good rainfall. As a result, output of peanuts and cereals expanded at an annual rate of about 10 percent. Expansion and contraction offset each other in 1989 and 1990 due to fluctuating weather. While the recovery in peanut production stimulated the vegetable oil-processing industry, other industries remained depressed because of a combination of

factors, which included the poor investment climate, the high cost of production factors (particularly labor and energy), a rigid labor market, and stiff competition from imports following the trade liberalization measures introduced in 1986. The service sector, which accounts for over half of GDP, performed well, despite the declining share of government services.

Only a small structural shift in employment from agriculture to industry took place in the postindependence period, with about 70 percent of the labor force remaining in agriculture. Wide fluctuations in agricultural output, largely a result of weather, alternately pulled overall GDP up and down. In 1984, when the value of crop output fell 42 percent, total GDP dropped by 5 percent. In 1986, when crops recovered by 20 percent, GDP rose 5 percent. Intense development efforts have failed to overcome the major constraints to agricultural production, including a fragile resource base, soil degradation, swings in international prices, and a poor domestic policy environment.

Policies in the 1980's

As noted earlier, Senegalese authorities adopted a series of adjustment programs during the last decade to redress the country's structural and financial problems. In the early 1980's, the results were unsatisfactory because of drought and lack of commitment to making difficult policy choices. Since 1983, Senegal has made substantial progress toward economic and financial adjustment. The Government has progressively liberalized the economy, strengthened agricultural and industrial production incentives, reduced the fiscal deficit, improved public investment programming, initiated public enterprise reform, and controlled domestic credit expansion.

Macroeconomic and Trade Policy Developments

The Government's medium-term adjustment program for 1985-92 and the Seventh Development Plan (1986-89) set out development objectives. The long-term goal was to lay a firm foundation for sustainable growth with equity. One of the targets was to achieve an average annual real GDP growth rate of 3.5 percent. The Government's strategy was based on two main goals: (1) progressive withdrawal of the state from production activities, along with promotion of private sector investment and production incentive policies, and (2) achievement of greater efficiency in public resource management.

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

In the early 1980's, Senegal's trade policies were a prime example of overlapping tariffs and quotas with contradictory effects. Nominal tariffs were high (ranging from 25 to 90 percent) and escalated sharply for finished goods, but extensive exemptions and duty waivers reduced tariff protection. Actual tariff collection averaged only 20 percent of the value of imports. Domestic producers pressed the Government to adopt quantitative import restrictions to increase domestic market prices. These contradictory policies (extensive duty exemptions, high tariffs, and quantitative import restrictions) prevented the Government from assessing the net effects of its policies or promoting areas of Senegalese comparative advantage.

Agricultural Policy Developments

The agricultural sector components of the reform program were primarily organized around the World Bank's Structural Adjustment Loans and the Government's 1984 general policy statement, the New Agricultural Policy (Nouvelle Politique Agricole, NPA). The main policy reform issues concerned the role and financial position of the government-owned enterprises, the liberalization of domestic cereal markets, the reduction in subsidies for inputs, such as fertilizer, seed, and implements, and the restructuring of relative prices between producers and consumers.

State intervention in agriculture has been marked in the past by gross inefficiencies and high budgetary costs. However, if the Government merely emphasizes reductions in budgetary transfers to agriculture, it will risk ignoring the development of an adequate longer term strategy for the sector. The critical issue that confronts policymakers is the means to raise agricultural productivity, which has remained at best constant over the last 25 years (2).

Producer Pricing Policies

Since 1983, the Government has pursued a policy of market liberalization that has reduced the scope of price controls. By December 1988, the Government still set minimum producer prices for peanuts, cotton, and rice and retail prices for basic foods, such as sugar, rice, tomatoes, tomato paste, vegetable oil, wheat flour, and bread.

The regulation of three key prices, the peanut producer price and the producer and consumer rice prices, has been central to achieving agricultural policy objectives in Senegal. The goal has been to stabilize incomes of peanut farmers in a time of volatile world prices. The retail price of rice has been held significantly above the import price to reduce demand and stimulate domestic production of rice and other cereals. The government monopoly on rice trade generated sizable public sector revenue. The Government has taken steps to align the producer price of peanuts and the retail price of rice with international prices.

Before the 1989/90 season, collection and processing of domestically produced rice was under the control of the Public Enterprise for Development of Irrigation in the Senegal River Delta (Societe d'Amenagement et d'Exploitation des Terres du Delta du Fleuve Senegal, SAED), which collected the rice from farmers and delivered it to the mills. Since the 1989/90 season, farmers have been responsible for delivery to the mills.[2] Once milled, the rice becomes the property of the Equalization and Price Stabilization Fund (Caisse de Perequation et des Prix, CPSP), which pays SAED and organizes transport and distribution to wholesale outlets. Overall, this system involves a large subsidy. It costs SAED about CFAF180 to produce a kilo of milled rice which sells at wholesale for CFAF120 per kilo (CFAF = Communaute Financiere Africaine, African Financial Community).

Marketing Policies

The reduction of the budgetary burden of rural parastatals and the associated withdrawal of the state from certain key functions have characterized recent public policy towards agriculture. The reform began with the abolition of the National Office for Development Assistance and Cooperation (Office National de Cooperation et d'Assistance pour le Developpement, ONCAD) in 1980 and its replacement by a smaller agency, National Office of Rural Supply (Societe Nationale d'Approvisionnement Rural, SONAR). ONCAD controlled the marketing of peanuts, rice, and millet, distributed inputs, and implemented the agricultural credit program. SONAR, principally charged with collecting and distributing peanut seed, was abolished in early 1985.

The reform of the agricultural parastatals has been meshed with a more general policy orientation that comprises three main areas:

- The transfer of key functions, such as peanut seed storage, to producers, thus linking them to stronger village-level organizations.

- The improvement of the input supply system, with the private sector playing the central role.

- The linking of peanut producer prices to the world price, while protecting domestic cereal producers against imports. This feature, with an emphasis on increasing food self-sufficiency, was formalized in the Plan Cerealier of April 1986.

The liberalization of domestic markets has affected all major agricultural commodities. After the abolition of ONCAD in 1980, the oil mills assumed responsibility for peanut marketing but were not allowed to buy directly from producers until late 1985. This policy marked a major change from the earlier system, under which the entire marketing chain was controlled by government institutions and financed at preferential rates by the Central Bank of West African States (Banque Centrale des Etats de l'Afrique de l'Ouest, BCEAO). The Government had assumed responsibility for peanut marketing after independence, with the idea of promoting rural development and reducing the role of foreigners. In 1975, a boom in export earnings allowed the Government to acquire a 65-per-

[2]One rice mill is privately owned and processes rice under contract with SAED. There are two state-owned mills at Ross-Bethio and Richard-Troll.

cent ownership of the peanut-processing industry, the Parastatal for Processing and Marketing of Edible Oils in Senegal (Societe Nationale de Commercialisation des Oleagineux du Senegal, SONACOS). Later, as the processing industry expanded and peanut oil prices declined, the Government was obligated to subsidize the mills. Policymakers are still grappling with the issue of reducing losses in the peanut sector while protecting oil mill employment and farmers' incomes.

In 1987/88, with the sharp decline in world market prices of peanut oil and with a much larger peanut output stemming from higher prices and favorable rainfall, the government deficit on peanut operations amounted to an estimated 1.6 percent of GDP. To reduce the deficit on peanut operations, the Government reduced the peanut producer price for the 1988/89 crop from CFAF90 to CFAF70 per kilo. This, together with the recovery in world prices, generated small surpluses in 1988/89 and 1989/90.

The Government has also liberalized cereal markets. Before October 1985, only licensed wholesalers were allowed to purchase coarse grains from producers. Since then, restrictions on grain collection and trade have been removed. A floor price replaced the official price, with margins no longer fixed by the Government. Guaranteeing the floor price is the responsibility of the Food Security Commission (Commission de la Securite Alimentarie, CSA). The role of the state in rice trade was also reduced, although to a more limited extent. Since 1980, the CPSP has controlled rice imports and distribution. In recent years, the private sector has been allowed to import small quantities of high-quality rice.

Input Policies

The Senegalese Government has promoted fertilizer use through subsidies since the 1960's. However, during the recent fiscal crisis, donors have insisted that these subsidies be reduced. The World Bank outlined five main conditions for loans. First, no Treasury financing for fertilizer subsidies was allowed, thereby eliminating the 50-percent average subsidy maintained since the mid-1970's. Second, temporary subsidies, financed by the U.S. Agency for International Development (USAID) and used to slow the increase in prices, had to be phased out. Third, fertilizer imports would be liberalized. Fourth, domestic marketing of fertilizer would be transferred to the private sector. Fifth, panterritorial pricing had to be abolished.

Fertilizer subsidies have played an important role in fertilizer use in Senegal, and the effect of reduced subsidies on price has been dramatic. By 1985/86, the average fertilizer price was 2.4 times the 1980 price in real terms, compared with the peanut producer price, which was only 13 percent higher. The effect on demand was significant. Fertilizer use fell from over 100,000 tons in 1980/81 to about 12,000 tons in 1986/87. In 1989, fertilizer was sold for the first time at the full market price, when a 4-year USAID fertilizer subsidy program ended. Fertilizer sales then amounted to less than 3,000 tons.

The retention of a share of the producer price to cover the provision of peanut seed and fertilizer was eliminated for the

1985/86 season. Reconstitution of the peanut seed stock was left to the farmers, with the SONACOS holding a buffer stock of 100,000 tons. Farmers were thus given the option of retaining their own seed or storing it with the oil mills. In addition, farmers could buy seed from the security stock, which is regarded by the Government as the foundation for a high-quality seed base. Senegal's seed policy is designed to foster the gradual entry of the private sector into marketing operations and of farmers into producing and conserving seed.

Credit Policies

The formal credit system in the agricultural sector collapsed when ONCAD was abolished in 1980. A critical constraint to Senegal's agricultural sector is the absence of any formal credit system. Between 1984 and 1988, the agricultural sector's share of total domestic credit (short- and long-term) was less than 2 percent. Barely 3 percent of private sector credit was directed towards agriculture. In recent years, payment of the debts amassed by ONCAD has used about half of total public sector credit. For example, seasonal crop credits, primarily for peanuts, were halved between 1980-83 and 1984-87.

Consumer Policies

The consumer polices of the Senegalese Government have often been contradictory because of conflicting pressures from producers and consumers. As noted earlier, reduced import dependency has been the primary food policy goal. However, only 19 percent of Senegal's land is classified as arable, and much of that is in areas of marginal rainfall, where the risk of crop failure is very high. Large-scale irrigation schemes have proved to be very expensive, driving production costs above import parity prices. Policy conflicts arise from the desire to provide incentives to producers while keeping retail food prices low.

Producer interests are served by fixing retail rice, sugar, and tomato paste prices above equilibrium levels, while consumers are implicitly taxed by fixed retail prices. The case of vegetable oil is not as clear, since world prices fluctuate widely. Also, local consumers prefer domestic peanut oil. The Government profits from most retail price controls.

Both the World Bank and the International Monetary Fund (IMF) have supported the privatization of rice trade. The trade monopoly of the CPSP was to be eliminated by the end of 1986, with full privatization a year later. However, these goals were compromised by several factors. First, the number of traders with sufficient capital to import rice was limited. Second, with the decrease in imported rice prices, the CPSP's surplus on the rice account has risen dramatically and has been used to support the government budget. As of the end of 1991, liberalization of rice imports had not been carried out.

While the Government's stated policy is to encourage consumption of domestic grains over wheat and rice, prices have favored rice consumption when processing and transportation costs are considered. Rice consumption, especially outside Dakar, increased during the 1980's, despite retail prices, which were significantly above import costs. The Govern-

ment tried to dampen demand for rice in 1984 by increasing the retail price from CFAF130 to CFAF160 a kilo. The price remained unchanged through 1986, while the import price fell from CFAF90 to CFAF50 a kilo. Pressure for market liberalization forced the Government in 1989 to respond to pressure from donors and consumers and let the retail price drop to CFAF130 a kilo. The Government hoped that lower rice prices for consumers would partially offset the effect of lower peanut producer price, which has negative consequence throughout the peanut-based economy.

The policy of encouraging millet/sorghum consumption faces severe constraints. Little arable land remains available to expand planted areas unless land is shifted from other crops. Such a shift has, in fact, been occurring for several years as farmers switched from peanuts to millet/sorghum to meet their own food needs. The scope is limited for extracting additional marketed surpluses from millet/sorghum producers.

The vegetable oil consumption policy favored other oils over peanut oil. The Government imported cheaper vegetable oils and exported peanut oil. The European Community program to stabilize export earnings from agricultural products for developing countries (STABEX) supported the price for a fixed volume of peanut oil exports and so provided an incentive for Senegal to export that quantity, even though oil was then imported for domestic consumption.

Estimation of Policy Intervention in Agriculture

Subsidies and taxes that affect Senegal's producers and consumers were estimated for four commodities using producer subsidy equivalents (PSE's) and consumer subsidy equivalents (CSE's) for the period 1982-89. Positive PSE's/CSE's indicate that the Government is subsidizing producers/consumers, while negative results indicate a tax. Transfers resulting from official price policies, fertilizer subsidies, and exchange rate policies are quantified for wheat, rice, millet/sorghum, and peanut oil.

Wheat, an imported commodity, provides about 6 percent of calories in the diet. Rice, providing 30 percent of calories, is both domestically produced and imported. Millet/sorghum, which gives 30 percent of calories, comes from domestic supplies. Peanuts, Senegal's main cash crop, are crushed for oil for export and domestic consumption. Vegetable oils supply only 6 percent of the calories in the typical diet.

These commodities were selected because of their importance in trade (wheat and rice) or because of the large share of land and labor devoted to them (millet/sorghum and peanuts). The Government controls the producer prices of rice and peanuts and the retail prices of rice, wheat flour, and vegetable oil. The producer price of millet/sorghum was also fixed until the beginning of the 1989/90 season, but the Government never really intervened in the market for this crop. Only a small portion of the crop entered marketing channels, and an even smaller share was purchased by the Government.

Exchange rate policy is determined by the fact that Senegal is a member of the franc zone and maintains an exchange rate fixed at a constant CFAF50 to 1 French franc. The convertibility of the currency is guaranteed by the French Treasury. While Senegal benefits from subsidies from the French Treasury, the Government cannot use exchange rate policy to effect transfers to or from producers, consumers, or the Government. Because the CFAF is freely convertible, PSE's and CSE's showed only small distortions due to exchange rate policies.

Results for Producers

The PSE's for Senegal were positive, on average, indicating a transfer of resources to producers (table 1). Between 1982 and 1989, the Government switched from taxing producers (a 17-percent tax in 1982-84) to subsidizing them (a 50-percent subsidy in 1987-89). Millet/sorghum and peanut oil account for 50 percent and 35 percent of the producer value of the commodities in this report, millet/sorghum because of the large quantities produced and peanut oil because of its high unit value.

Exchange rate policy had little effect because the CFAF was very close to the equilibrium rate. Some observers report that the CFAF is currently overvalued. Estimates of the extent of the overvaluation range up to 50 percent (8). However, these estimates were not supported by such economic indicators as the real effective exchange rate or the inflation rate. The unofficial rate reported in the *World Currency Yearbook* was used in the calculations (3).

Results by Commodity

The Government exerts strong control over the peanut sector. All peanuts crushed for export or domestic consumption are processed at the government mills. The producer price in the early 1980's was set at CFAF70 a kilo, but CFAF10-20 were withheld to pay for seed and fertilizer. Net returns to farmers varied from CFAF50 to CFAF60 a kilo between 1982 and 1984. During that time, production fell from 1 million tons to 500,000 tons. Sales to the mills declined even more, from 700,000 tons to 140,000 tons. By 1984, more than two-thirds of the crop was being marketed outside official channels and was consumed as nuts or processed into oil by small-scale, inefficient methods. The oil mills, with a capacity of about 1 million tons, operated very inefficiently.

Favorable world prices for peanut oil encouraged the Government to increase the peanut producer price to CFAF90 a kilo in 1985 (fig. 1). The producer tax dropped rapidly, and when the high producer price was maintained despite falling world prices, producers received subsidies in 1986 and 1987 (table 2). The oil mills accumulated huge deficits in these years, forcing the Government to reduce the producer price. The deficits have now been controlled, but the Government continues to confront the difficulties caused by its price stabilization policy, given volatile world prices.

The goal of Senegal's rice policy has been to reduce import dependency. This policy has been very expensive because high

Table 1—Senegal: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Fertilizer subsidy	Mil. CFAF	1,420	1,406	0	384	371	193	118	0
Price subsidy	Mil. CFAF	11,686	-15,349	-5,483	23,778	75,349	84,376	43,598	31,321
Foreign exchange	Mil. CFAF	-1,166	-3,291	-2,872	1,142	607	193	-974	-1,542
Policy transfers by commodity:									
Millet/sorghum	Mil. CFAF	9,072	1,120	1,049	23,125	29,205	37,376	28,934	28,950
Rice	Mil. CFAF	2,198	2,106	3,142	10,710	15,195	14,543	12,730	14,929
Peanuts	Mil. CFAF	669	-20,461	-12,546	-8,531	31,927	32,843	1,077	-14,101
PSE by commodity:									
Millet/sorghum	Percent	31	6	4	35	66	73	65	53
Rice	Percent	45	33	35	86	121	126	96	91
Peanuts	Percent	2	-195	-148	-35	63	55	4	-35
Total policy transfers	Mil. CFAF	11,939	-17,235	-8,355	25,304	76,327	84,762	42,741	29,779
Value to producers	Mil. CFAF	77,227	36,316	45,723	103,686	107,670	122,699	84,690	111,611
Total commodity PSE	Percent	15	-47	-18	24	71	69	50	27

CFAF = African Financial Community franc.
PSE = Producer subsidy equivalent.

production costs raise the price of domestic rice significantly above that of imported rice. The CPSP purchases domestic rice from mills at CFAF180 per kilo and resells it at the wholesale price of CFAF120 per kilo. The Government held retail prices above import parity to support domestic producers.

Figure 1

Senegal: Peanut oil producer subsidy equivalent

The results for millet/sorghum are difficult to analyze because the commodity is not traded, and the sorghum sold in international markets is a poor substitute for the commodity produced and consumed in Senegal. Eliminating millet/sorghum from the total would reduce producer subsidies.

Results by Policy

Price policy is by far the most important method of government intervention for producers in Senegal. Fluctuations in the level of producer subsidies reflect the Government's price stabilization policies, which fail to respond to changes in international prices. The Government has continued to provide price subsidies to producers, but the cost has declined from the peak of 1987. If the subsidy to millet/sorghum producers is discounted, the rice subsidy and the peanut oil tax offset each other in 1989.

Price policy is a very sensitive political issue because agricultural and food prices have a large effect on the living standards of most Senegalese. Political pressures often slow the government response to international price changes.

The value of fertilizer subsidies was small compared with other policy interventions. Most of the subsidies were phased out after 1983. The small subsidies provided from 1985 to 1988 were part of a USAID program to ease the transition to free-market pricing for fertilizer. All subsidies were finally eliminated in 1989.

Results for Consumers

Senegalese consumers were taxed at increasingly higher rates throughout the 1980's (table 3). In 1982-84, these taxes averaged 27 percent of consumer cost, while in 1987-89, they averaged more than 50 percent. The Government's pricing policy was the principal factor underlying the taxes. Rice and millet/sorghum had the highest consumer taxes.
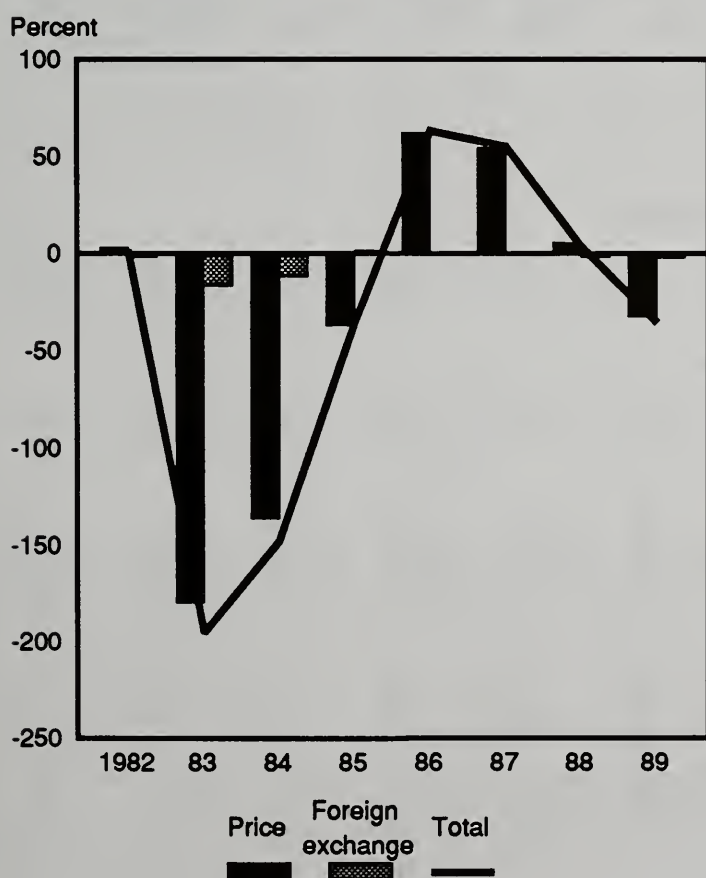
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Table 2—Senegal: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Millet/sorghum:									
Level of production	1,000 tons	585	352	471	950	634	801	594	767
Producer price	CFAF/ton	50,000	55,000	60,000	70,000	70,000	64,000	74,400	71,000
Value to producers	Mil. CFAF	29,250	19,360	28,260	66,500	44,380	51,264	44,194	54,457
Policy transfers to producers--									
Fertilizer subsidy	Mil. CFAF	680	748	0	172	168	105	19	0
Price subsidy	Mil. CFAF	8,730	1,468	2,398	22,352	28,804	37,206	29,250	29,423
Foreign exchange	Mil. CFAF	-337	-1,096	-1,349	601	233	65	-335	-473
Total policy transfers	Mil. CFAF	9,072	1,120	1,049	23,125	29,205	37,376	28,934	28,950
PSE (per unit value)	Percent	31	6	4	35	66	73	65	53
PSE (per unit quantity)	CFAF/ton	15,508	3,181	2,228	24,342	46,065	46,661	48,710	37,745
	US$/ton	47	8	5	54	133	155	164	118
Rice:									
Level of production	1,000 tons	95	108	136	147	148	136	146	168
Producer price	CFAF/ton	51,500	60,000	66,000	85,000	85,000	85,000	91,100	97,700
Value to producers	Mil. CFAF	4,893	6,480	8,976	12,495	12,580	11,560	13,301	16,414
Policy transfers to producers--									
Fertilizer subsidy	Mil. CFAF	612	597	0	128	96	51	71	0
Price subsidy	Mil. CFAF	1,676	1,994	3,673	10,457	15,028	14,476	12,814	15,117
Foreign exchange	Mil. CFAF	-91	-484	-531	125	72	17	-155	-188
Total policy transfers	Mil. CFAF	2,198	2,106	3,142	10,710	15,195	14,543	12,730	14,929
PSE (per unit value)	Percent	45	33	35	86	121	126	96	91
PSE (per unit quantity)	CFAF/ton	23,132	19,502	23,106	72,858	102,671	106,933	87,191	88,866
	US$/ton	70	51	53	162	296	356	293	279
Peanut oil:									
Level of production	1,000 tons	244	71	48	93	192	226	132	198
Producer price	CFAF/ton	176,471	147,059	176,471	264,706	264,706	264,706	205,882	205,882
Value to producers	Mil. CFAF	43,085	10,476	8,487	24,691	50,710	59,875	27,196	40,740
Policy transfers to producers--									
Fertilizer subsidy	Mil. CFAF	128	61	0	84	107	37	27	0
Price subsidy	Mil. CFAF	1,280	-18,811	-11,554	-9,031	31,517	32,694	1,534	-13,220
Foreign exchange	Mil. CFAF	-739	-1,710	-992	417	302	112	-484	-881
Total policy transfers	Mil. CFAF	669	-20,461	-12,546	-8,531	31,927	32,843	1,077	-14,101
PSE (per unit value)	Percent	2	-195	-148	-35	63	55	4	-35
PSE (per unit quantity)	CFAF/ton	2,740	-287,223	-260,891	-91,454	166,657	145,197	8,155	-71,260
	US$/ton	8	-754	-597	-204	481	483	27	-223

CFAF = African Financial Community franc.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Table 3—Senegal: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. CFAF	-39,703	-36,244	-32,588	-82,864	-106,111	-109,743	-85,056	-71,593
Foreign exchange	Mil. CFAF	900	4,212	3,644	-1,031	-530	-128	1,015	1,137
Policy transfers by commodity:									
Wheat	Mil. CFAF	-1,931	-1,640	985	-2,058	-4,698	-2,986	912	1,508
Millet/sorghum	Mil. CFAF	-24,466	-14,106	-15,167	-45,552	-53,199	-56,241	-53,692	-50,374
Rice	Mil. CFAF	-12,406	-16,286	-14,762	-36,286	-48,744	-50,645	-31,260	-21,589
Peanut oil	Mil. CFAF	-246	70	57	-317	-18,666	-19,258	-4,428	-406
CSE by commodity:									
Wheat	Percent	-16	-10	6	-11	-28	-22	6	9
Millet/sorghum	Percent	-45	-28	-28	-47	-66	-71	-66	-58
Rice	Percent	-27	-28	-27	-50	-69	-71	-45	-34
Peanut oil	Percent	-34	8	9	-19	-69	-64	-25	-2
Total policy transfers	Mil. CFAF	-39,049	-31,962	-28,886	-84,212	-125,306	-129,129	-88,468	-70,861
Cost to consumers	Mil. CFAF	114,359	126,239	125,242	190,852	195,870	193,789	182,219	184,081
Total commodity CSE	Percent	-34	-25	-23	-44	-64	-67	-49	-38

CFAF = African Financial Community franc.
CSE = Consumer subsidy equivalent.

Results by Commodity

Wheat consumers were taxed in 5 of the 8 years (table 4). The Government continued to increase flour prices through 1986, despite falling world prices. Between 1984 and 1986, the cost to the mills of a ton of wheat fell from CFAF90,000 to CFAF63,000, while the retail price of flour increased from CFAF170 to CFAF200 a kilo. Wheat flour and bread prices are regulated by the Government as a matter of economic and social policy. The CPSP is responsible for controlling wheat and flour prices. Some of the profits from flour sales accrued to the government budget, thereby creating an incentive to increase revenues by maintaining higher prices.

Retail prices have been allowed to decline since 1986 as a part of the market liberalization program. The lower flour prices were intended to offset the effect on incomes of the reduced peanut producer prices. Because of the importance of peanuts in the Senegalese economy, a lower producer price for this commodity has repercussions throughout the economy.

As with the PSE's, the CSE's for millet/sorghum show a substantial level of government intervention (fig. 2). Such intervention gives a misleading impression of this nontraded commodity. While Senegalese consumers are highly taxed compared with the reference price, the sorghum traded internationally is a poor substitute for the domestic product. Sorghum imported as food aid in drought years was sold at a

Table 4—Senegal: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	122	137	133	132	118	109	135	156
Retail price	CFAF/ton	100,800	122,400	122,400	144,450	144,450	124,425	104,400	104,400
Cost to consumers	Mil. CFAF	12,298	16,769	16,279	19,067	17,045	13,562	14,094	16,286
Policy transfers to consumers--									
Price subsidy	Mil. CFAF	-2,018	-2,098	558	-1,959	-4,646	-2,973	806	1,388
Foreign exchange	Mil. CFAF	87	459	427	-98	-52	-12	106	120
Total policy transfers	Mil. CFAF	-1,931	-1,640	985	-2,058	-4,698	-2,986	912	1,508
CSE (per unit value)	Percent	-16	-10	6	-11	-28	-22	6	9
CSE (per unit quantity)	CFAF/ton	-15,828	-11,968	7,409	-15,588	-39,813	-27,390	6,754	9,670
	US$/ton	-48	-31	17	-35	-115	-91	23	30
Millet/sorghum:									
Level of consumption	1,000 tons	664	563	547	865	716	768	684	757
Retail price	CFAF/ton	82,500	90,000	97,500	112,500	112,500	103,500	119,100	114,000
Cost to consumers	Mil. CFAF	54,780	50,670	53,333	97,313	80,550	79,488	81,464	86,298
Policy transfers to consumers--									
Price subsidy	Mil. CFAF	-24,849	-15,860	-16,733	-45,005	-52,936	-56,179	-54,079	-50,841
Foreign exchange	Mil. CFAF	383	1,754	1,566	-547	-263	-62	386	467
Total policy transfers	Mil. CFAF	-24,466	-14,106	-15,167	-45,552	-53,199	-56,241	-53,692	-50,374
CSE (per unit value)	Percent	-45	-28	-28	-47	-66	-71	-66	-58
CSE (per unit quantity)	CFAF/ton	-36,846	-25,055	-27,728	-52,661	-74,300	-73,230	-78,498	-66,545
	US$/ton	-112	-66	-63	-117	-215	-244	-264	-209
Rice:									
Level of consumption	1,000 tons	452	446	423	455	444	443	492	492
Retail price	CFAF/ton	103,000	130,000	130,000	160,000	160,000	160,000	140,000	130,000
Cost to consumers	Mil. CFAF	46,556	57,980	54,990	72,800	71,040	70,880	68,880	63,960
Policy transfers to consumers--									
Price subsidy	Mil. CFAF	-12,837	-18,286	-16,412	-35,900	-48,529	-50,591	-31,783	-22,140
Foreign exchange	Mil. CFAF	431	2,000	1,651	-386	-215	-54	523	551
Total policy transfers	Mil. CFAF	-12,406	-16,286	-14,762	-36,286	-48,744	-50,645	-31,260	-21,589
CSE (per unit value)	Percent	-27	-28	-27	-50	-69	-71	-45	-34
CSE (per unit quantity)	CFAF/ton	-27,447	-36,516	-34,897	-79,748	-109,783	-114,322	-63,537	-43,881
	US$/ton	-84	-96	-80	-177	-317	-380	-213	-138
Peanut oil:									
Level of consumption	1,000 tons	2	2	1	3	52	57	51	50
Retail price	CFAF/ton	362,739	461,500	461,500	521,495	521,495	521,495	350,740	350,740
Cost to consumers	Mil. CFAF	725	821	640	1,672	27,235	29,858	17,781	17,537
Policy transfers to consumers--									
Price subsidy	Mil. CFAF	-252	27	29	-303	-18,583	-19,229	-4,613	-629
Foreign exchange	Mil. CFAF	6	43	29	-14	-82	-28	186	223
Total policy transfers	Mil. CFAF	-246	70	57	-317	-18,666	-19,258	-4,428	-406
CSE (per unit value)	Percent	-34	8	9	-19	-69	-64	-25	-2
CSE (per unit quantity)	CFAF/ton	-123,014	39,111	41,334	-98,962	-357,414	-336,349	-87,338	-8,125
	US$/ton	-374	103	95	-220	-1,032	-1,119	-293	-25

CFAF = African Financial Community franc.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

discount of up to 30 percent compared with local grains. The government policy is to encourage substitution of local coarse grains for imported wheat and rice. The price of millet/sorghum is now determined by the free market.

Government intervention in the rice market is the most important as far as consumers are concerned (fig. 3). Expenditures on rice make up a significant share of the family food budget in rural as well as urban areas. Per capita consumption is 90 kilos a year in the cities and 40 kilos in the countryside (8). As with wheat, the Government allowed retail rice prices to increase while international prices were falling. Senegal imports mostly low-quality 100-percent broken rice, which sells at a substantial discount internationally. The import price of this rice fell from CFAF91,000 a ton in 1984 to CFAF51,000 a ton in 1986.

Government rice policies reflected two goals. The first was the encouragement of domestic production by providing incentives to producers. The second was the protection of government windfalls, which increased as the gap between the import and the retail price widened. These policies have changed in response to pressure to liberalize markets and reduce the distortions caused by set prices. The Government also sought to reduce pressure on consumers that resulted from the lower peanut price by reducing retail rice prices from CFAF160 to CFAF130 a kilo in 1989. Rice is an important component of Senegalese diets even in rural areas. With

70 percent of the labor force in agriculture and most farmers producing some peanuts, the lower retail rice price would help offset the loss of income from peanuts.

Results by Policy

Two policies in the CSE analysis were common to all four commodities: the price wedge component and the exchange rate component. The consumer price wedge resulted from the same policy that affected the producer price wedge; namely, that of administratively determined and stable prices that did not reflect world price movements. The foreign exchange effects were the opposite of those for producers, since these involved subsidies in 1982-84 and 1988-89 when the currency was slightly overvalued. Otherwise, the effects on foreign exchange policies on consumers were insignificant.

Conclusions

Senegal's 1985-92 medium-term economic recovery program was supported by the World Bank and the IMF. The program's objective was to return the country to a sustainable growth path while correcting severe financial imbalances. To restore growth, the Government planned to improve the quality of public investments by rehabilitating productive infrastructure. Above all, the private sector was to be encouraged

Figure 2

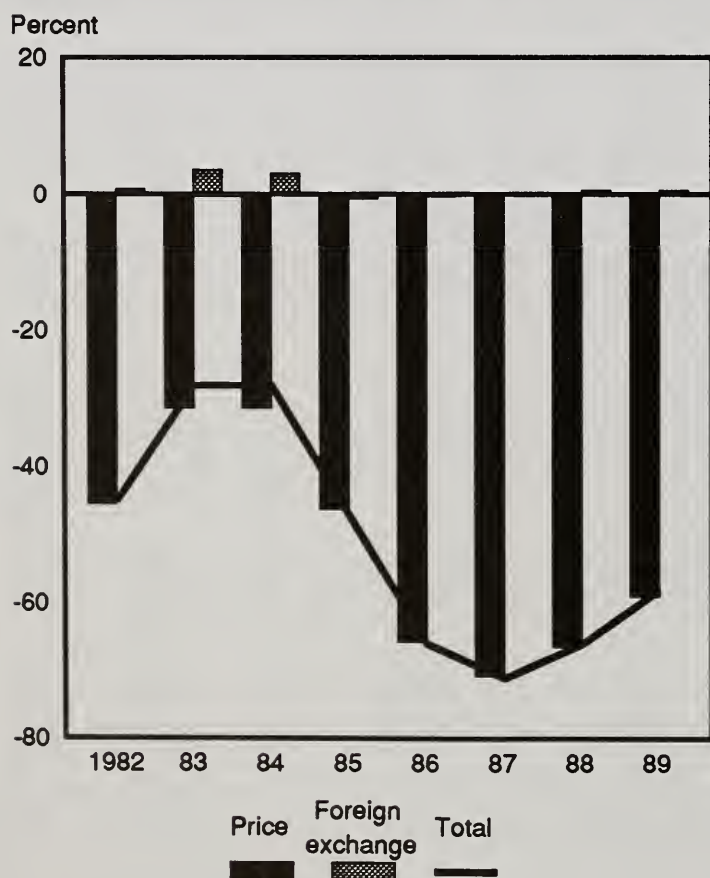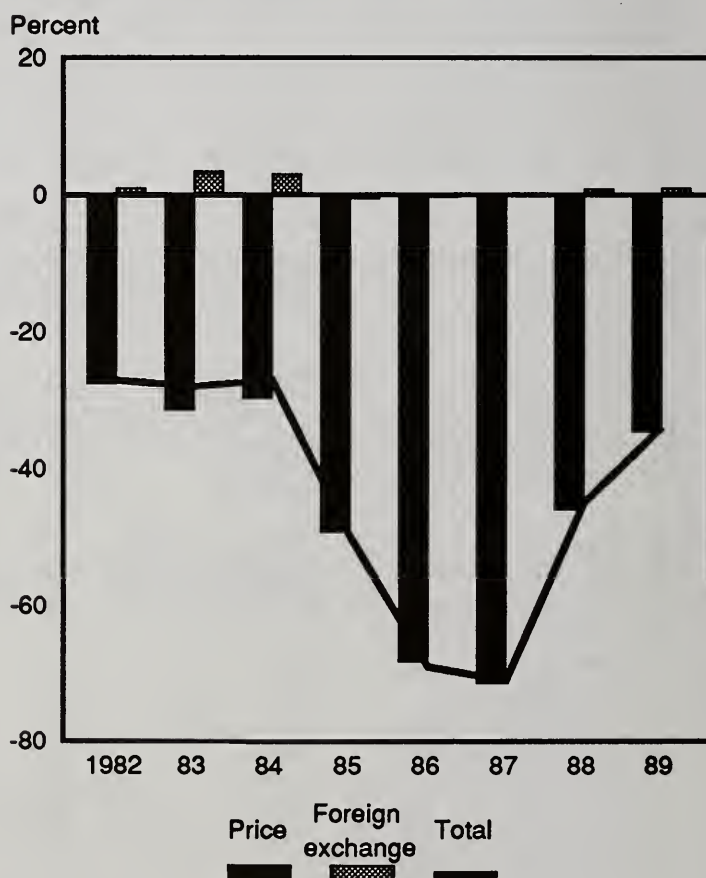**Senegal: Sorghum consumer subsidy equivalent**

Figure 3

Senegal: Rice consumer subsidy equivalent

through a liberalized regulatory environment (especially in trade and pricing), an improved incentives system, and a sound financial sector.

Some progress has been made in structural change, most notably in moving to a narrow-band tariff regime from quantitative restrictions, in more rational public investment programming, and in decontrolling prices in domestic trade for most commodities. Economic activity rebounded in 1990 as agriculture recovered from the drought of 1989 and as real GDP grew 4.5 percent. Inflation has remained below 3 percent, and the external situation has continued to improve, as the current account deficit fell to 7.8 percent of GDP in 1990 from 9.5 percent in 1988.

The Government has significantly liberalized the agricultural sector in recent years and plans to pursue key reforms in the context of a World Bank agricultural sector adjustment loan. The authorities are reassessing the protection system for cereals. Revisions affect the pricing for imported rice, the mechanism for managing the importation of lower quality rice, and the role of the SAED in the production and marketing of domestic rice. In the peanut sector, the Government has decided to link the producer price to the international price. It also intends to privatize the peanut oil-processing company.

The role of the Government in the near future will be to stabilize prices around international equilibrium levels rather than subsidize producer prices. The peanut producer price for 1991/92 was increased from CFAF70 to CFAF80 a kilo to reflect the higher world peanut oil prices in 1990 and 1991. An immediate challenge involves the huge subsidies that Senegal still pays to rice producers, and this issue must be addressed.

Senegal consistently taxed its consumers. However, the rate of taxation fell from 67 percent in 1987 to 38 percent in 1989. Retail rice prices were reduced to align them more closely with the world price. The policy aims to protect consumers from world price fluctuations. While local prices are now more closely aligned with world prices, consumers will be taxed or subsidized on an annual basis as the cost of imports rises and falls.

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Appendix: Methodology

Producer and consumer subsidy equivalents were estimated for four crops in Senegal, including imported commodities (wheat and rice), an exported commodity (peanut oil), and a nontraded commodity (millet/sorghum).

Pricing Policy

For PSE's, domestic producer prices, including an estimate of marketing costs, were compared with reference prices plus transportation costs. Data on processing costs were included where available. The cost, insurance, and freight (c.i.f) prices were used for wheat and rice, and the U.S. gulf price was used for sorghum. For peanut oil, the unit value of Senegal's exports was used as the reference price. For CSE's, the retail price was compared with the reference price. The price of wheat flour was converted to wheat equivalent. Where appropriate, the reference prices in U.S. dollars were converted to local currency at the official exchange rate.

The reference price for wheat was based on the actual cost of wheat delivered to the flour mills (import cost plus transportation to the mills). Senegal does not produce wheat, and so, only CSE's were calculated. Estimates of the handling and milling costs reported in the Foreign Agricultural Service's 1989 *Senegal Grain and Feed Annual Report* (11) were used to estimate costs at the retail level. The costs for 1982-88 were calculated by deflating the 1989 figures by the Consumer Price Index.

For millet/sorghum, the sorghum price at U.S. gulf ports was used as the reference price. The value was increased by 10

percent to account for a taste and quality preference for local cereals. Most sorghum traded internationally is used for animal feed. The ocean freight rates for wheat were applied to sorghum. Marketing costs were assumed to add 20 percent to the producer price. No actual data on marketing costs were available.

The reference price used for rice was the c.i.f. reported at the port of Dakar. Marketing costs were added to the producer price of paddy rice, and that price was converted to milled rice equivalent. The Government-controlled retail price was compared with the reference price to arrive at the CSE price.

The unit value of Senegal's peanut oil exports was used as the reference price. The producer price of peanuts was converted to the peanut oil equivalent. The average unit value of peanut meal exports was used as an estimate of peanut-processing costs. On average, mills hope to cover their processing cost with the sale of meal. This is a conservative estimate of processing costs in Senegal, given the inefficiency of the mills. The producer price and processing costs were added

and compared with the export unit value. The CSE price was calculated by subtracting the retail price of peanut oil from the export price and multiplying the difference times consumption.

Exchange Rate Policy

The CFAF is maintained at a fixed value of 50 CFAF = 1 French franc. The Senegalese Government cannot adjust the exchange rate. The unofficial exchange reported in the *World Currency Yearbook* was used in the calculations (3). The reference price was converted to local currency at both the official and unofficial exchange rates, and the difference between the two prices was multiplied by the quantity produced or consumed.

Fertilizer Policy

Data on the per ton value of the subsidy of fertilizer and the amount used on each crop were available. These two figures were multiplied to arrive at the value of the fertilizer subsidy for each crop.

Appendix table 1--Wheat: Calculation of Senegal's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Consumption	1,000 tons	122	137	133	132	118	109	135	156
B. Retail price, flour	CFAF/ton	100,800	122,400	122,400	144,450	144,450	124,425	104,400	104,400
C. Consumer cost (A*B)/1,000	Mil. CFAF	12,298	16,769	16,279	19,067	17,045	13,562	14,094	16,286
D. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, c.i.f. flour mill	CFAF/ton	63,867	78,204	89,985	88,075	63,382	57,799	71,561	74,300
b. Milling costs	CFAF/ton	20,394	28,879	36,610	41,532	41,698	39,347	38,806	39,000
c. Retail price, flour	CFAF/ton	100,800	122,400	122,400	144,450	144,450	124,425	104,400	104,400
d. Price support (1a+1b-1c)*A/1,000	Mil. CFAF	-2,018	-2,098	558	-1,959	-4,646	-2,973	806	1,388
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Border price, equilibrium exchange rate	CFAF/ton	64,578	81,553	93,199	87,330	62,939	57,688	72,348	75,070
d. Exchange rate subsidy (1c-2c)*A/1,000	Mil. CFAF	87	459	427	-98	-52	-12	106	120
E. Total transfers to consumers:									
1. Total (1d+2d)	Mil. CFAF	-1,931	-1,640	985	-2,058	-4,698	-2,986	912	1,508
2. Consumer subsidy equivalents (E1/C)*100	Percent	-16	-10	6	-11	-28	-22	6	9

CFAF = African Financial Community franc.
c.i.f. = Cost, insurance, and freight.
US$ = U.S. dollar.

Appendix table 2--Millet/sorghum: Calculation of Senegal's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	991	784	1,002	1,335	993	1,074	1,023	1,085
B. Production	1,000 tons	585	352	471	950	634	801	594	767
C. Producer price	CFAF/ton	50,000	55,000	60,000	70,000	70,000	64,000	74,400	71,000
D. Producer value (B*C)/1,000	Mil. CFAF	29,250	19,360	28,260	66,500	44,380	51,264	44,194	54,457
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including marketing costs	CFAF/ton	60,000	66,000	72,000	84,000	84,000	76,800	89,280	85,200
b. Border price, U.S. gulf port plus transportation	US$/ton	137	162	153	135	111	101	134	147
c. Border price, U.S. gulf port plus transportation	CFAF/ton	45,077	61,830	66,909	60,471	38,567	30,351	40,038	46,839
d. Price support (1a-1c)*B/1,000	Mil. CFAF	8,730	1,468	2,398	22,352	28,804	37,206	29,250	29,423
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Border price, equilibrium exchange rate	CFAF/ton	45,654	64,945	69,772	59,839	38,200	30,270	40,602	47,455
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. CFAF	-337	-1,096	-1,349	601	233	65	-335	-473
3. Fertilizer--									
a. Domestic subsidy	CFAF/ton	83,900	50,900	0	20,000	24,000	16,000	8,000	0
b. Fertilizer use	1,000 tons	8	15	12	9	7	7	2	3
c. Fertilizer subsidy, 3a*3b/1,000	Mil. CFAF	680	748	0	172	168	105	19	0
F. Total transfers to producers:									
1. Total (1d+2d+3c)	Mil. CFAF	9,072	1,120	1,049	23,125	29,205	37,376	28,934	28,950
2. Producer subsidy equivalents (F1/D)*100	Percent	31	6	4	35	66	73	65	53
G. Consumption	1,000 tons	664	563	547	865	716	768	684	757
H. Retail price, millet meal	CFAF/ton	82,500	90,000	97,500	112,500	112,500	103,500	119,100	114,000
I. Consumer cost (G*H)/1,000	Mil. CFAF	54,780	50,670	53,333	97,313	80,550	79,488	81,464	86,298
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, U.S. gulf port plus transportation	CFAF/ton	45,077	61,830	66,909	60,471	38,567	30,351	40,038	46,839
b. Retail price, millet meal	CFAF/ton	82,500	90,000	97,500	112,500	112,500	103,500	119,100	114,000
c. Price support (1a-1b)*G/1,000	Mil. CFAF	-24,849	-15,860	-16,733	-45,005	-52,936	-56,179	-54,079	-50,841
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	314	313	306	280	258	272	289	303
c. Border price, equilibrium exchange rate	CFAF/ton	45,654	64,945	69,772	59,839	38,200	30,270	40,602	47,455
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. CFAF	383	1,754	1,566	-547	-263	-62	386	467
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. CFAF	-24,466	-14,106	-15,167	-45,552	-53,199	-56,241	-53,692	-50,374
2. Consumer subsidy equivalents (K1/I)*100	Percent	-45	-28	-28	-47	-66	-71	-66	-58

ha. = Hectare.
CFAF = African Financial Community franc.
US$ = U.S. dollar.

Appendix table 3--Rice: Calculation of Senegal's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	68	52	66	71	72	74	81	80
B. Production, paddy	1,000 tons	95	108	136	147	148	136	146	168
C. Producer price, paddy	CFAF/ton	51,500	60,000	66,000	85,000	85,000	85,000	91,100	97,700
D. Producer value (B*C)/1,000	Mil. CFAF	4,893	6,480	8,976	12,495	12,580	11,560	13,301	16,414
E. Policy transfers to producers:									
1. Price policy--									
a. Producer price including marketing costs	CFAF/ton	92,239	107,463	118,209	152,239	152,239	152,239	163,164	174,985
b. Border price, import unit value	CFAF/ton	74,600	89,000	91,200	81,100	50,700	45,800	75,400	85,000
c. Price support (1a-1b)*B/1,000	Mil. CFAF	1,676	1,994	3,673	10,457	15,028	14,476	12,814	15,117
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Percent overvaluation	Percent	1	5	4	-1	-1	-0	1	1
d. Border price, equilibrium exchange rate	CFAF/ton	75,553	93,484	95,103	80,252	50,217	45,678	76,463	86,119
e. Exchange rate subsidy (1b-2d)*B/1,000	Mil. CFAF	-91	-484	-531	125	72	17	-155	-188
3. Fertilizer --									
a. Domestic subsidy	CFAF/ton	83,900	50,900	0	20,000	24,000	16,000	8,000	0
b. Fertilizer use	1,000 tons	7	12	12	6	4	3	9	2
c. Fertilizer subsidy, 3a*3b/1,000	Mil. CFAF	612	597	0	128	96	51	71	0
F. Total transfers to producers:									
1. Total (1c+2e+3c)	Mil. CFAF	2,198	2,106	3,142	10,710	15,195	14,543	12,730	14,929
2. Producer subsidy equivalents (F1/D)*100	Percent	45	33	35	86	121	126	96	91
G. Consumption	1,000 tons	452	446	423	455	444	443	492	492
H. Retail price	CFAF/ton	103,000	130,000	130,000	160,000	160,000	160,000	140,000	130,000
I. Consumer cost (G*H)/1,000	Mil. CFAF	46,556	57,980	54,990	72,800	71,040	70,880	68,880	63,960
J. Policy transfers to consumers:									
1. Price policy--									
a. Border price, import unit value	CFAF/ton	74,600	89,000	91,200	81,100	50,700	45,800	75,400	85,000
b. Retail price	CFAF/ton	103,000	130,000	130,000	160,000	160,000	160,000	140,000	130,000
c. Price support (1a-1b)*G/1,000	Mil. CFAF	-12,837	-18,286	-16,412	-35,900	-48,529	-50,591	-31,783	-22,140
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Border price, equilibrium exchange rate	CFAF/ton	75,553	93,484	95,103	80,252	50,217	45,678	76,463	86,119
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. CFAF	431	2,000	1,651	-386	-215	-54	523	551
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. CFAF	-12,406	-16,286	-14,762	-36,286	-48,744	-50,645	-31,260	-21,589
2. Consumer subsidy equivalents (K1/I)*100	Percent	-27	-28	-27	-50	-69	-71	-45	-34

ha. = Hectare.
CFAF = African Financial Community franc.
US$ = U.S. dollar.

Appendix table 4--Peanut oil: Calculation of Senegal's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	NA	NA	NA	NA	NA	NA	NA	NA
B. Production, oil	1,000 tons	244	71	48	93	192	226	132	198
C. Producer price, oil	CFAF/ton	176,471	147,059	176,471	264,706	264,706	264,706	205,882	205,882
D. Producer value (B*C)/1,000	Mil. CFAF	43,085	10,476	8,487	24,691	50,710	59,875	27,196	40,740
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price	CFAF/ton	176,471	147,059	176,471	264,706	264,706	264,706	205,882	205,882
b. Producer price plus processing costs	CFAF/ton	241,943	212,531	241,943	330,178	330,178	330,178	271,355	271,355
c. Border price, export unit value	CFAF/ton	236,700	476,600	482,200	427,000	165,660	185,640	259,740	338,162
d. Price support (1a-1b)*B/1,000	Mil. CFAF	1,280	-18,811	-11,554	-9,031	31,517	32,694	1,534	-13,220
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Percent overvaluation	Percent	1	5	4	-1	-1	-0	1	1
d. Border price, equilibrium exchange rate	CFAF/ton	239,725	500,611	502,834	422,533	164,081	185,146	263,402	342,615
e. Exchange rate subsidy (1c-2d)*B/1,000	Mil. CFAF	-739	-1,710	-992	417	302	112	-484	-881
3. Fertilizer--									
a. Domestic subsidy	CFAF/ton	83,900	50,900	0	20,000	24,000	16,000	8,000	0
b. Fertilizer use	1,000 tons	2	1	9	4	4	2	3	3
c. Fertilizer subsidy, 3a*3b/1,000	Mil. CFAF	128	61	0	84	107	37	27	0
F. Total transfers to producers:									
1. Total (1d+2e+3c)	Mil. CFAF	669	-20,461	-12,546	-8,531	31,927	32,843	1,077	-14,101
2. Producer subsidy equivalents (F1/D)*100	Percent	2	-195	-148	-35	63	55	4	-35
G. Consumption	1,000 tons	2	2	1	3	52	57	51	50
H. Retail price	CFAF/ton	362,739	461,500	461,500	521,495	521,495	521,495	350,740	350,740
I. Consumer cost (G*H)/1,000	Mil. CFAF	725	821	640	1,672	27,235	29,858	17,781	17,537
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, export unit value	CFAF/ton	236,700	476,600	482,200	427,000	165,660	185,640	259,740	338,162
b. Retail price	CFAF/ton	362,739	461,500	461,500	521,495	521,495	521,495	350,740	350,740
c. Price support (1a-1b)*G/1,000	Mil. CFAF	-252	27	29	-303	-18,583	-19,229	-4,613	-629
2. Exchange rate adjustment--									
a. Official exchange rate	CFAF/US$	329	381	437	449	346	301	298	319
b. Equilibrium exchange rate	CFAF/US$	333	400	456	445	343	300	302	323
c. Border price, equilibrium exchange rate	CFAF/ton	239,725	500,611	502,834	422,533	164,081	185,146	263,402	342,615
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. CFAF	6	43	29	-14	-82	-28	186	223
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. CFAF	-246	70	57	-317	-18,666	-19,258	-4,428	-406
2. Consumer subsidy equivalents (K1/I)*100	Percent	-34	8	9	-19	-69	-64	-25	-2

ha. = Hectare.
CFAF = African Financial Community franc.
US$ = U.S. dollar

South Africa

By Gene A. Mathia and Margaret Missiaen

Economic and Agricultural Developments

South Africa is an upper-middle-income country with a per capita income of nearly $2,500. The 40 million inhabitants live in an area almost twice the size of Texas (3).[1] Its semiarid climate and open space for cattle grazing are similar to those of Texas. The income distribution is highly skewed toward the mining and manufacturing sectors that are owned and controlled by the white minority. The majority, particularly blacks, sustain impoverished living standards typical of many developing countries.

Since 1948, the South African economy has been operating under a legislative mandate that attempts to separate racial groups. This places restrictions on where the black population can live and work and on land ownership. These policies caused the international community to impose economic sanctions, beginning in the 1970's, which affect both trade and financial transactions.

The financial sanctions hamper financial flows to South Africa and, in effect, reduce its access to external capital. This reduced access placed great pressure during most years of the 1980's to maintain a current account surplus that could offset the large net capital outflows. These internal and external conditions constrained economic growth. In the first half of the 1980's, real gross domestic product (GDP) growth averaged less than 1 percent annually. In the second half of the 1980's, growth accelerated to 1.5 percent per year. However, given the population growth rate of slightly more than 2 percent annually, real incomes declined through the 1980's in per capita terms.

South Africa had a current account deficit averaging more than $1 billion annually during 1980-84. Since 1985, the year when major trade partner sanctions were instituted, the current account balance has been positive, averaging more than $2 billion annually. This turnaround can be attributed to a sharp drop in imports in 1984-85 and to a steady rise in exports during 1985-88.

South Africa's total imports declined 30 percent between 1985 and 1986. Since 1987, however, imports have increased to $17 billion. Agricultural imports have remained fairly stable through the 1980's at $8 billion annually. Total and agri-

cultural exports have gradually increased since 1982, averaging around $22 billion and $2 billion late in the decade.

Gold and several other strategic minerals not affected by the ban made up a large share of South Africa's export earnings, about 60 percent in the mid-1980's. Gold alone contributed almost 50 percent of mineral exports. The ability to export minerals enabled South Africa to maintain positive current accounts. Manufacturing had been slowly growing but contributed only about 10 percent to export earnings. Agriculture's contribution to export earnings had been falling before the sanctions, but the sanctions created additional problems by forcing South African exporters to search for smaller, high-cost markets. Some export diversification has occurred, but the removal of these sanctions could significantly affect the type of domestic agricultural policy reforms and the response patterns that might be expected in the agricultural sector.

Recent elections, in which the winning party supported a more moderate political agenda and gradual political reform, may be sufficient to cause further relaxation of trade sanctions. Most observers think that the performance of the economy will improve when these sanctions are relaxed. The agricultural sector would be a potential beneficiary of the removal of trade sanctions, since many of South Africa's agricultural exports have been banned by the United States, the European Community, and Japan, all former major trading partners.

South Africa's agricultural sector has a small number of white farmers who represent a large, productive, and diversified commercial subsector that controls most of the land resources. South Africa also has a large number of black small farmers who represent a subsistence subsector that controls few resources. South Africa is one of the few African countries that is a net agricultural exporter in most years, despite the trade sanctions. Agricultural exports represent about 40 percent of agricultural gross national product (GNP). The main exports are corn and corn products, wool, sugar, hides and skins, and mohair, while the principal imports are wheat and rice.

Policies in the 1980's

South Africa maintained for many years a legislative agenda that enforced practices that placed severe restrictions on the majority group of blacks. Thus, a large reserve of labor resources has not been active in the economy, and few attempts

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

have been made to educate and train the blacks for productive activity in a modern economy. More recently, the discrimination against the blacks has been lessening, and the country is entering a critical transition stage with more opportunities open to a disadvantaged majority. But, until the Government resolves the issues of concern to the international community and sanctions are removed, South Africa's growth will depend on the current account surplus and the level of investment that it can finance for itself.

Macroeconomic and Trade Policy Developments

The objectives of monetary policy as stated in the Reserve Bank Act are to reduce inflationary pressure, to achieve relative price stability, to maintain a satisfactory external position, and to ensure adequate growth with a high level of employment. The main mechanism of monetary policy is the bank rate. Changes in the bank rate are made to influence market interest rates and, consequently, the level of credit demand. Public debt manipulations and open-market operations are also used to manage interest rates.

Foreign exchange arrangements have been important in managing the foreign disinvestment that has plagued South Africa for several years. In 1985, a dual exchange rate system was instituted to reverse the adverse effects on the balance of payments of foreign disinvestment and capital outflows. South Africa does not maintain margins with respect to exchange transactions for the commercial rand but does intervene in the exchange market to affect the rates quoted by commercial banks. The floating financial rand system operates with respect to a local sales and redemption process of South African securities and other investments in the country. The financial rand trades at a variable discount relative to the commercial rand, ranging from 38 to 25 percent, depending more on political than economic factors (5).

The level of government debt has remained relatively stable at around 30-35 percent of GDP. However, the ratio of domestic to foreign debt has increased sharply.

The goals of fiscal policy have recently moved from a long-term economic growth strategy to more short-term macroeconomic stabilization. Problems with economic development have been blamed on a lack of investment in housing, education, and health. Agriculture was not listed among the more critical needs.

The Government operated a budget deficit of 2-5 percent of GDP during the last half of the 1980's. In the 1990-91 budget presentation, economic restructuring was listed as essential for stimulating economic growth. The goals of this restructuring were as follows: (1) gradually lowering inflation, which is currently running at about 15 percent, to the same levels as South Africa's important trading partners, (2) increasing the savings rate of the household sector, which has abandoned saving because of high inflation rates, (3) lowering personal tax burdens, (4) channeling savings into more productive investments, (5) instituting responsible wage determination, (6) promoting competitiveness of the industrial

sector, and (7) eliminating the factors that prevent relative prices of resources from reflecting their relative scarcity. The agricultural sector was not targeted for reform, although the sector was plagued with underemployment. Wages of blacks were around 30 percent those of whites. Per capita incomes of blacks were 8-10 percent those of whites.

The Government has adopted a protrade policy with the international community, despite the unilateral sanctions. Export promotion programs have been instituted as a way to offset the effects of trade sanctions. South Africa's ability to compete in international markets has been greatly aided by its ties to large multinational firms that did not elect to divest.

In agricultural trade, the Government has few direct restraints on imports but is aggressive in marketing excess production to foreign buyers. These exports were sold at subsidized prices, frequently below the estimated cost of production. The procedures for providing export subsidies will be described for each commodity considered in this study.

South Africa is committed to a number of international agreements, and it plans to participate in the activities of several international organizations. It has agreed to comply with the terms of the General Agreement on Tariffs and Trade (GATT) and with the International Beef, Pork, and Grains Agreements. It has a bilateral trade agreement with Taiwan. It supports improved trade relations with the Customs Union Agreement, and it has cooperational agreements with the Economic Council of Southern African States (10).

Agricultural Policy Developments

The general direction of agricultural policy during the last 2-3 years is toward more free-market determination and privatization of resources (2). Subsidization serves more to stabilize farmers' incomes than to encourage increased output and export market shares. Resource conservation is on the rise, and the Government is attempting to move resources from soil-depleting crops to increased livestock production (12).

In the commercial agricultural sector, a well-organized and politically powerful bloc of farmers lobby for and receive government assistance. Yet, government expenditures on this sector have dropped sharply since 1985, when its share of total expenditures was a little more than 3 percent. The share in 1990/91 is budgeted at 1.7 percent. The primary objectives of government policies in this sector are removing variation from producers' incomes and elevating the overall level of prices to these producers. Production that exceeds domestic needs is exported at subsidy levels, depending on the world price and domestic price support levels. Self-sufficiency in food production is promoted as the long-term goal for rural black farmers, which is important to the subsistence sector but has little significance to the very efficient commercial sector with its long history of exporting to international markets.

Producer Pricing Policies

Corn and winter cereals are marketed through a single-channel fixed-price scheme (7). Sugarcane comes under terms of

other legislation (13). The schemes for corn and winter cereals fix the price before planting. Before 1988, the price was often set above market equilibrium price. The excess production was purchased at the fixed price and exported at a subsidized price, frequently below the estimated costs of production. Taxpayers paid the costs of the export subsidies, while domestic consumers paid the higher than market equilibrium prices for grains for both feed and food use. Since 1988, subsidies have been paid from a stabilization fund created and funded by a levy on producers (11).

Since the 1987-88 marketing season, price determination has been the responsibility of the marketing boards. Prices are set to benefit producers in the long run, to signal expected returns before planting, and to avoid loans by the industry to finance a certain marketing year. The marketing board considers crop size, international market conditions, exchange rates, domestic demand, marketing costs, operational financing, and government aid, if any. Because the first price quote is announced 8-9 months before the crop is delivered and the final marketings are made after about 2 years, changed marketing conditions may have far-reaching effects on what prices the producer will actually receive. The process continues by announcing a delivery price paid to producers upon the delivery of a product. The final price is determined during a marketing season, and if marketing conditions have been favorable, supplementary payments are made to producers.

Until 1985, the South African Sugar Association administered the marketing of sugar under a single-price scheme. Sucrose production was controlled with quotas, and producers received one price for the product. The quota was registered to a particular tract of land, but it could be transferred to a different area. The producer received a weighted mean price of the domestic price and the expected export price plus transport subsidies and an equalization fund payment (8).

In 1985, a two-tier price scheme was introduced to assist small producers. It is composed of two pools. The A-pool is based on a quota for the domestic market plus about 50 percent of previous mean exports, and farmers receive a subsidized price under normal marketing conditions. The B-pool is voluntary, and growers receive the export realization price (9).

Marketing Policies

The Department of Agriculture and Water Supply organizes agriculture in South Africa as a single agricultural unit. The South African Agriculture Union (SAAU) is the national organization acting for all commercial farmers. Its purpose is to ensure the best possible financial and social position for farmers within the national economy. The SAAU also serves the needs of the cooperatives. Agricultural cooperatives function to provide farmers with agricultural inputs and to market the farmers' agricultural products in both unprocessed and processed forms.

The Directorate of Marketing was established in 1988 with two subdirectorates: Marketing Administration and Market-

ing Policy. The Directorate's mission is to administer the Marketing Act of 1968. The Sub-directorate of Marketing Administration deals with the implementation of this act. The Sub-directorate has several functions dealing with the marketing of most agricultural products and the budgeting of expenditures on corn and bread subsidies.

At present, the Directorate administers 21 agricultural commodity control boards. Management of the marketing of about 80 percent of the gross value of agricultural products is conducted under these control schemes. The commodity board is the basic entity for administering the various efforts to stabilize and support commodity prices. Much of the credit and marketing infrastructure subsidies are channeled through each commodity board.

Input Policies

South African farmers procure inputs from agricultural cooperatives. Agricultural cooperatives have provided about 60 percent of the farmers' needs in recent years. Several types of financial aid are available to farmers, including mortgage credit and production loans, as well as grants for soil and water improvements, such as flood control.

Interest rates on these loans are difficult to specify because the recoverable amount varies for the outstanding principal of the loans on which interest is charged. The amount is determined by the Minister of Agriculture and approved by the Minister of Finance. Farmers pay a subsidized rate of only 3 percent, well below commercial rates, on loans for the housing of permanent farm laborers. There is little evidence, however, that input subsidies are used as major production incentives.

Consumer Policies

Wheat for domestic food requirements is sold at a fixed price, which is adjusted monthly to cover handling, storage, and financing costs. No price is fixed for wheat sold for local feed use or export. Bread price subsidies are gradually being removed by raising the consumer price.

The domestic selling price for corn is higher than the producer price. The difference in the prices is used to finance internal handling, storage, and financing costs as well as export subsidies.

Estimation of Policy Intervention in Agriculture

Government intervention in South African agriculture is pervasive and occurs through the sector's more than 20 control boards authorized under the 1968 Marketing Act (1). Only about 20 percent of gross value of agricultural production was produced and marketed under free-market conditions in 1988. The three commodities selected for study here (corn, wheat, and sugar) accounted for about 25 percent of gross agricultural value in 1988. Slaughter cattle, milk and butterfat,

wool, eggs, deciduous fruit, oilseeds, wine, and citrus fruits were also important commodities marketed under government control schemes. However, policy and price data are not available for calculating the costs and benefits of intervention for these commodities.

Government intervention in wheat and corn production includes transportation, fertilizer, credit subsidies, price supports, and foreign exchange regulations. On the consumer side, price and foreign exchange subsidies and grants are factors of intervention. Sugar is marketed through cooperatives, but government policies affect both producers and consumers of sugar.

Results for Producers

The estimates of producer subsidy equivalents (PSE's) are summarized for 1982-89 in table 1. The policy decision of the Government to reduce its intervention in agriculture is apparently working. Producers received large transfers in 1983-84 and 1986-87 but were taxed in 1988 and 1989. The subsidies peaked in 1987 at 33 percent of producers' revenue. The taxes in the 2 most recent years of the study averaged 12 percent.

Results by Commodity

On average, corn producers received the largest subsidies in absolute terms (table 2). The subsidies also exhibited an increasing trend through 1987, averaging about 7 percent of producer revenue in 1982 compared with 39 percent in 1987 (fig. 1). In 1988, corn producers incurred a tax, and in 1989, received a negligible subsidy. The change since 1987 can be attributed to two factors: the movement toward market-oriented policies to determine producer prices, which resulted

in a slowdown of producer price hikes, and the sharp rise in the world corn price.

Wheat producers were alternately taxed and subsidized through the study period. The taxes, which occurred in 1985, 1986, 1988, and 1989, averaged 18 percent of producer revenue. The subsidies ranged from less than 3 percent to more than 26 percent.

Sugar producers received the largest transfers as a proportion of producer revenue. These transfers were received during 1983-88 and averaged 28 percent of producer revenue.

Results by Policy

Pricing policies of the marketing boards and the Sugar Association have been the major source of producer subsidies for all three commodities. Price movements for sugar were controlled by government import licensing requirements. On the other hand, foreign exchange policies worked against producers of the three crops. The average level of currency overvaluation was more than 9 percent. All producers benefited from the interest rate subsidy on agricultural credit. Transportation and fertilizer policies resulted in small transfers to producers throughout the 1982-89 period.

It is too early to determine the effects of reduced support on production patterns. Areas planted to wheat were largely unaffected by the reduction of support in 1988 and 1989. The acreage of marginal land planted to sugar has dropped gradually since the responsibility of cane transportation was transferred to growers in 1984 and since the two-price pool system was introduced in 1985. Corn acreage declined by about 10 percent in 1988-89, even though the level of support to corn producers remained positive.

Table 1—South Africa: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Transportation subsidy	Mil. R	0.9	1.5	5.5	4.2	3.0	1.4	2.0	0.8
Fertilizer subsidy	Mil. R	6.8	4.1	1.8	1.7	1.5	1.2	0.5	0.0
Credit subsidy	Mil. R	75.3	98.9	144.2	122.4	135.7	123.4	130.3	170.5
Price subsidy	Mil. R	328.3	124.4	189.2	17.7	780.8	1,247.0	-436.6	-206.8
Import controls	Mil. R	-171.3	181.1	55.0	153.3	317.4	326.2	95.0	-328.7
Foreign exchange	Mil. R	-293.9	-195.6	-122.9	-317.5	-421.6	-485.7	-219.9	-222.7
Policy transfers by commodity:									
Wheat	Mil. R	114.5	75.7	53.6	-121.0	-19.8	268.3	-270.1	-224.9
Corn	Mil. R	81.8	-0.4	178.9	-7.3	586.0	729.5	-219.5	3.3
Sugar	Mil. R	-250.1	139.2	40.2	110.2	250.6	215.6	60.9	-365.3
PSE by commodity:									
Wheat	Percent	17.2	15.9	7.8	-22.7	-2.4	22.0	-22.4	-26.1
Corn	Percent	7.2	-0.1	17.5	-0.4	30.3	39.4	-11.8	0.1
Sugar	Percent	-74.2	38.0	11.9	24.1	49.2	34.9	10.0	-50.0
Total policy transfers	Mil. R	-53.8	214.5	272.6	-18.1	816.8	1,213.4	-428.7	-586.9
Value to producers	Mil. R	2,143	1,564	2,045	2,787	3,270	3,688	3,682	4,847
Total commodity PSE	Percent	-2.5	13.7	13.3	-0.6	25.0	32.9	-11.6	-12.1

R = Rand.
PSE = Producer subsidy equivalent.

The reduction of government support is intended to cut across all tradable commodities and thus would not be expected to greatly affect the production shares or relative profitability of producing these commodities. One stated goal of the Government's policy is to encourage forestry and pasture over export crops. The efforts by the various marketing boards to set producer prices to equate production to domestic consumption are intended to reduce export subsidies. However, trade seems to be more closely tied to weather patterns than to any policy actions. Even with sanctions, South Africa is relying on the international market to manage surplus production or provide for production shortfalls.

Results for Consumers

The levels of support to consumers for the three commodities has declined (table 3). During the first half of the study period (1982-85), total transfers to consumers increased but never exceeded 13 percent of the total cost of the crops. However, in the second half of the study period (1986-89), consumers were either taxed (1986-87) or given negligible subsidies.

Results by Commodity

Wheat consumers have benefited from the favorable wheat policies. Bread price subsidies and favorable foreign exchange more than offset the wheat price taxes for all years except 1987 (table 4). The net subsidy ranged from less than 16 percent of the cost of the crop to more than 50 percent. The effective tax on wheat in 1987 was very large because of low international prices for wheat relative to the price set by the wheat board.

Corn consumers, on the other hand, were more likely to be taxed than wheat consumers, particularly in the latter half of the study period (fig. 2). Taxes to corn consumers peaked in

## Table 2--South Africa: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	2,434	1,774	2,335	1,684	2,322	3,146	3,539	2,005
Producer price	R/ton	274	268	294	317	354	387	341	430
Value to producers	Mil. R	666	476	687	534	823	1,219	1,207	862
Policy transfers to producers--									
Transportation subsidy	Mil. R	0.2	0.3	1.0	0.8	0.6	0.3	0.4	0.2
Fertilizer subsidy	Mil. R	2.5	1.6	0.7	0.4	0.4	0.5	0.2	0.0
Credit subsidy	Mil. R	21.8	28.6	41.6	35.3	26.3	43.6	47.8	43.0
Price subsidy	Mil. R	151.2	92.7	46.8	-103.9	48.2	362.5	-250.2	-234.4
Foreign exchange	Mil. R	-61.1	-47.5	-36.5	-53.6	-95.3	-138.5	-68.3	-33.7
Total policy transfers	Mil. R	114.5	75.7	53.6	-121.0	-19.8	268.3	-270.1	-224.9
PSE (per unit value)	Percent	17.2	15.9	7.8	-22.7	-2.4	22.0	-22.4	-26.1
PSE (per unit quantity)	R/ton	47.1	42.7	22.9	-71.9	-8.5	85.3	-76.3	-112.2
	US$/ton	43.5	38.4	16.0	-32.8	-3.8	41.9	-33.8	-42.9
Corn:									
Level of production	1,000 tons	8,503	4,318	4,714	8,295	8,321	7,342	7,251	12,442
Producer price (yellow)	R/ton	134	167	217	217	233	252	258	262
Value to producers	Mil. R	1,140	721	1,021	1,797	1,937	1,850	1,867	3,254
Policy transfers to producers--									
Transportation subsidy	Mil. R	0.7	1.2	4.5	3.4	2.4	1.2	1.6	0.7
Fertilizer subsidy	Mil. R	4.3	2.5	1.0	1.3	1.1	0.7	0.3	0.0
Credit subsidy	Mil. R	48.9	64.2	93.6	79.4	101.0	71.9	73.9	117.7
Price subsidy	Mil. R	177.1	31.7	142.4	121.6	732.6	884.5	-186.4	27.6
Foreign exchange	Mil. R	-149.3	-100.0	-62.6	-213.1	-251.0	-228.8	-108.8	-142.7
Total policy transfers	Mil. R	81.8	-0.4	178.9	-7.3	586.0	729.5	-219.5	3.3
PSE (per unit value)	Percent	7.2	-0.1	17.5	-0.4	30.3	39.4	-11.8	0.1
PSE (per unit quantity)	R/ton	9.6	-0.1	37.9	-0.9	70.4	99.4	-30.3	0.3
	US$/ton	8.9	-0.1	26.4	-0.4	31.0	48.8	-13.4	0.1
Sugar:									
Level of production	1,000 tons	2,055	2,126	1,378	2,370	2,170	2,200	2,235	2,240
Producer price	R/ton	164	172	245	193	235	281	272	326
Value to producers	Mil. R	337	366	337	456	510	619	608	731
Policy transfers to producers--									
Import controls	Mil. R	-171.3	181.1	55.0	153.3	317.4	326.2	95.0	-328.7
Credit subsidy	Mil. R	4.7	6.2	9.0	7.6	8.4	7.9	8.7	9.7
Foreign exchange	Mil. R	-83.6	-48.1	-23.8	-50.8	-75.2	-118.5	-42.8	-46.3
Total policy transfers	Mil. R	-250.1	139.2	40.2	110.2	250.6	215.6	60.9	-365.3
PSE (per unit value)	Percent	-74.2	38.0	11.9	24.1	49.2	34.9	10.0	-50.0
PSE (per unit quantity)	R/ton	-121.7	65.5	29.2	46.5	115.5	98.0	27.2	-163.1
	US$/ton	-112.5	58.9	20.3	21.2	50.9	48.2	12.0	-62.3

R = Rand.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Figure 1

South Africa: Corn producer subsidy equivalent
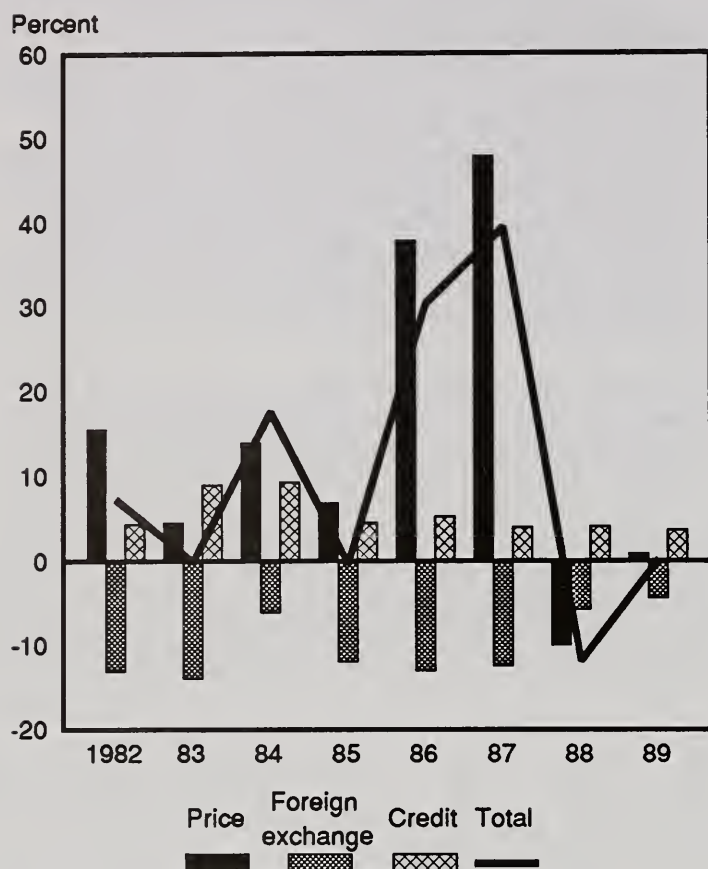
Percent

Price ▬ Foreign exchange ▨ Credit ▧ Total ▬

by sharp increases in prices during years of production short-falls because of the export contracts with Asian countries.

Sugar consumers were burdened by paying prices that were higher than international prices. The net taxes varied and have averaged about a third of the cost of the crop. Domestic production changed very little during the period, but consumption for all purposes trended upward. The sugar industry has promoted a strategy to change consumer attitudes about the potential harmful effects of sugar and to create new uses for the product, but per capita consumption of sugar has remained about 34 kilograms annually. Another goal is to stop or limit"dumping"of foreign sugar entering the local market either as sugar or as intermediate products. To the extent that these goals are achieved, consumers will pay higher prices.

Except for the last few years, domestic sugar prices have been pushed higher than world prices because of supply-side factors, such as incentives to limit the area planted to sugar-cane. Marginal sugar lands have been diverted to timber and pasture. Rates of return to capital for sugar production are set fairly low, and cost-of-production pricing is not conducive to bringing many marginal sugar lands back into production.

The Sugar Association must now finance export subsidies and is reluctant to provide many incentives for export expansion beyond contract levels (pool A sugar). These costs of subsidizing exports and the limited profitability of production suggest that South Africa's sugar production is not likely to expand much above the current level.

Results by Policy

1987 at 33 percent of the cost of the crop. Domestic prices have been raised more and at a faster rate than world prices. Consumers may be paying higher than world prices in the future if promotion efforts to divert land to pastures for increased livestock grazing are successful. Also, consumers may be hurt

The Government's foreign exchange policy consistently worked to subsidize consumers through the overvalued currency during the study period. The pricing policy for grain resulted in a tax on wheat and corn consumers in most years because the respective wholesale prices exceeded interna-

Table 3--South Africa: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy on grain	Mil. R	-263.2	-40.3	-6.4	120.7	-623.8	-1,040.2	127.2	-41.0
Price subsidy on bread	Mil. R	182.0	193.5	267.6	194.3	180.5	147.0	147.4	132.0
Import controls	Mil. R	40.0	-193.8	-103.3	-210.4	-202.5	-249.0	-348.5	-87.3
Foreign exchange	Mil. R	215.9	244.4	129.9	234.1	293.1	359.1	158.2	139.3
Policy transfers by commodity:									
Wheat	Mil. R	96.2	104.3	238.4	374.0	203.3	-77.0	229.1	413.1
Corn	Mil. R	-8.3	266.3	131.6	147.8	-398.8	-527.1	176.3	-211.0
Sugar	Mil. R	86.8	-166.7	-82.1	-183.1	-157.2	-179.0	-321.0	-59.1
CSE by commodity:									
Wheat	Percent	17.4	15.6	35.3	51.5	24.1	-7.1	23.1	38.1
Corn	Percent	-0.8	23.6	10.6	11.4	-26.5	-32.5	10.4	-9.9
Sugar	Percent	24.5	-40.8	-17.2	-32.9	-23.4	-22.5	-30.9	-5.1
Total policy transfers	Mil. R	175	204	288	339	-353	-783	84	143
Cost to consumers	Mil. R	1,965	2,204	2,392	2,582	3,020	3,503	3,729	4,379
Total commodity CSE	Percent	8.9	9.2	12.0	13.1	-11.7	-22.4	2.3	3.3

R = Rand.
CSE = Consumer subsidy equivalent.

tional prices. Bread consumers were subsidized in all years of the study, since the Government subsidized bakeries to keep the bread prices low. Finally, the Government's import controls, which were measured for sugar, resulted in a tax on sugar for consumers in all years because the local price was set above the world price.

Conclusions

Recent policy actions taken by the Government of South Africa suggest a move to more open-market operations, with little government support of commodity board operations. Export subsidies are becoming the responsibility of the industry group. Marketing boards are, therefore, forced to be very cautious in setting producer prices at levels that will provide incentives to create surplus production. Yet, subsidies to agricultural producers come from board action in setting producer prices. In the past, foreign exchange rates were an important factor, but the more flexible rate structure will reduce this potential source of subsidy or taxation. Credit subsidies have been a relatively

minor source of support and may decrease even further as the Government tries to reduce expenditures on agriculture.

The future of South African agriculture appears to depend on the power of the producer groups to exact higher than world prices from domestic consumers. Producers will need the power of Government to protect domestic markets from imports. Although South Africa uses very modern technology in much of its agriculture and its resources are considerable, the production of agricultural goods for international markets does not appear to be a high priority. Even without sanctions, South Africa would appear to be a high-cost producer of agricultural products with few clear comparative advantages in the temperate tradable commodities. Its highly variable weather patterns will create alternate production gluts and shortfalls, and the international market will likely offer an important safety net for managing the agricultural sector. In all likelihood, the removal of international sanctions would have little effect on government management of the sector. South Africa is not likely to select agriculture as an export growth sector. Furthermore, the Government is unlikely to adopt an aggressive export promotion orientation for agricultural products in the near future.

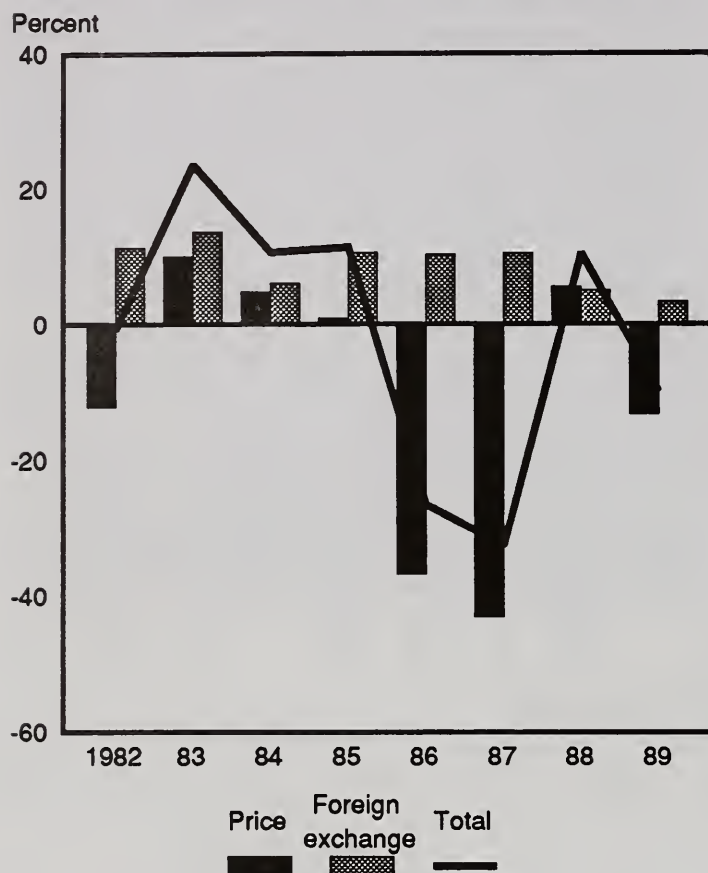## Table 4--South Africa: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	1,971	2,377	2,228	2,207	2,315	2,732	2,493	2,424
Wholesale price	R/ton	280	280	303	329	365	398	398	448
Cost to consumers	Mil. R	552	666	675	726	845	1088	993	1085
Policy transfers to consumers--									
Price subsidy on grain	Mil. R	-135.2	-152.8	-64.1	109.4	-72.2	-344.3	33.6	240.4
Price subsidy on bread	Mil. R	182.0	193.5	267.6	194.3	180.5	147.0	147.4	132.0
Foreign exchange	Mil. R	49.4	63.6	34.8	70.3	95.0	120.3	48.1	40.8
Total policy transfers	Mil. R	96.2	104.3	238.4	374.0	203.3	-77.0	229.1	413.1
CSE (per unit value)	Percent	17.4	15.6	35.3	51.5	24.1	-7.1	23.1	38.1
CSE (per unit quantity)	R/ton	48.8	43.9	107.0	169.5	87.8	-28.2	91.9	170.4
	US$/ton	45.1	39.4	74.4	77.3	38.7	-13.9	40.6	65.1
Corn:									
Level of consumption	1,000 tons	6,960	6,806	5,725	5,479	5,206	5,573	5,675	6,362
Wholesale price (yellow)	R/ton	155	170	221	243	285	288	295	333
Cost to consumers	Mil. R	1,058	1,129	1,239	1,300	1,503	1,620	1,697	2,124
Policy transfers to consumers--									
Price subsidy on grain	Mil. R	-128.0	112.5	57.7	11.3	-551.6	-695.9	93.6	-281.4
Foreign exchange	Mil. R	119.6	153.8	73.9	136.5	152.8	168.8	82.7	70.5
Total policy transfers	Mil. R	-8.3	266.3	131.6	147.8	-398.8	-527.1	176.3	-211.0
CSE (per unit value)	Percent	-0.8	23.6	10.6	11.4	-26.5	-32.5	10.4	-9.9
CSE (per unit quantity)	R/ton	-1.2	39.1	23.0	27.0	-76.6	-94.6	31.1	-33.2
	US$/ton	-1.1	35.2	16.0	12.3	-33.8	-46.5	13.7	-12.7
Sugar:									
Level of consumption	1,000 tons	1,152	1,195	1,225	1,272	1,305	1,300	1,433	1,360
Wholesale price	R/ton	308	342	390	437	516	612	725	860
Cost to consumers	Mil. R	355	409	478	556	673	795	1039	1170
Policy transfers to consumers--									
Import controls	Mil. R	40.0	-193.8	-103.3	-210.4	-202.5	-249.0	-348.5	-87.3
Foreign exchange	Mil. R	46.8	27.0	21.2	27.2	45.2	70.0	27.5	28.1
Total policy transfers	Mil. R	86.8	-166.7	-82.1	-183.1	-157.2	-179.0	-321.0	-59.1
CSE (per unit value)	Percent	24.5	-40.8	-17.2	-32.9	-23.4	-22.5	-30.9	-5.1
CSE (per unit quantity)	R/ton	75.4	-139.5	-67.0	-144.0	-120.5	-137.7	-224.0	-43.5
	US$/ton	69.7	-125.4	-46.6	-65.7	-53.1	-67.7	-99.1	-16.6

R = Rand.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

Figure 2

South Africa: Corn consumer subsidy equivalent

Percent

Price ▬ Foreign exchange ▨ Total ▬

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Appendix: Methodology

Producer and consumer subsidy equivalents were estimated for three crops in South Africa. The level of government intervention was calculated for wheat, produced domestically and also imported; corn, the staple food and export commodity; and sugar, consumed domestically and also exported.

Pricing Policy

For PSE's, producer prices were compared with world (reference) prices plus ocean freight, converted to local currency (rand) at the official exchange rate. Data on marketing and processing costs were included if available. The reference prices used were the U.S. gulf price for wheat, South African export prices for corn, and the Caribbean raw price for sugar.

On the consumer side, the reference prices were compared with retail or wholesale prices. The wholesale price of wheat and the bread subsidy were used to calculate the wheat consumer subsidy equivalent (CSE). The wholesale prices of white and yellow corn and the white sugar price converted to raw sugar equivalent were used to calculate the corn and sugar CSE's.

The producer price of wheat minus the import cost (world price plus transportation) was used to determine the price PSE. For consumers, the difference between the wholesale wheat price and the import price was calculated. Then, the reported bread subsidy was added to arrive at the total wheat CSE (*10*).

When the price PSE for corn was computed, the Maize Marketing Board's cost on domestic sales was added to the producer price and compared with the export price. South Africa is an important supplier of white corn to Far Eastern countries that pay a premium for this high-quality product. The unit value of South African exports is a better reference price than the U.S. price of yellow feed corn. This export price was compared with the wholesale price to estimate CSE's. In recent years, when the price of white corn was significantly above that for yellow, a weighted average of the two prices was used.

Price intervention for sugar took the form of import controls because domestic prices are significantly above world prices. The producer price of sugarcane was converted to raw sugar equivalent using the sucrose content. Refining costs were added to the raw price and then compared with the reference price for Caribbean raw sugar. For CSE's, the price of white sugar in Durban was converted to raw equivalent by subtracting the refining cost and the refining weight loss. The difference between these two raw prices was the unit value of the price CSE.

Exchange Rate Policy

The effect of exchange rate policy on consumers and producers was calculated by converting the reference price to rand at the unofficial rate and comparing this with the price converted at the official rate. The unofficial rate was reported in the *World Currency Yearbook* (*4*). The exchange rate transfers were calculated by taking the difference between these prices (the one converted at the official rate and the one at the unofficial rate) and multiplying by the volume of production.

Fertilizer Policy

Fertilizer subsidies were computed by calculating the value of each crop as a share of total crop value. This percentage was then used to allocate the total fertilizer subsidy among crops.

Credit Policy

The total value of agricultural credit was multiplied by the interest rate subsidy and then by the share of credit allocated to each crop.

Transportation Policy

Total transportation subsidies were divided among the crops so that 6 percent was allocated to wheat and 23 percent to corn.

Appendix table 1—Wheat: Calculation of South Africa's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	1,974	1,809	1,919	1,951	1,926	1,729	1,985	1,830
B. Production	1,000 tons	2,434	1,774	2,335	1,684	2,322	3,146	3,539	2,005
C. Producer price	R/ton	274	268	294	317	354	387	341	430
D. Producer value (B*C)/1,000	Mil. R	666	476	687	534	823	1,219	1,207	862
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price	R/ton	274	268	294	317	354	387	341	430
b. Border price, U.S. gulf port plus transportation	US$/ton	195	194	191	173	147	134	182	209
c. Border price, U.S. gulf port plus transportation	R/ton	211	216	274	379	334	272	412	547
d. Price support (1a-1c)*B/1,000	Mil. R	151	93	47	-104	48	362	-250	-234
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, equilibrium exchange rate	R/ton	237	243	290	411	375	316	431	564
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. R	-61	-47	-37	-54	-95	-138	-68	-34
3. Fertilizer transfers--									
a. Field crop value	Mil. R	3,172	3,101	3,413	4,749	4,584	5,241	5,914	7,343
b. Fertilizer subsidy, all crops	Mil. R	12.0	10.6	3.5	3.5	2.5	2.0	1.0	0.0
c. Fertilizer subsidy ((D/3a)*3b)	Mil. R	2.5	1.6	0.7	0.4	0.4	0.5	0.2	0.0
4. Credit transfers--									
a. Government agricultural credit	Mil. R	2,604	3,420	4,600	5,642	6,219	6,597	7,237	8,104
b. Interest rate subsidy	Percent	6	6	7	5	5	4	4	4
c. Share of credit to wheat	Percent	14	14	14	14	9	17	17	13
d. Credit subsidy (4a*(4b/100)*(4c/100))	Mil. R	22	29	42	35	26	44	48	43
5. Transportation transfers--									
a. Transportation subsidy	Mil. R	3	5	19	15	10	5	7	3
b. Wheat share of subsidy	Percent	6	6	6	6	6	6	6	6
c. Transportation subsidy (5a*(5b/100))	Mil. R	0.2	0.3	1.1	0.8	0.6	0.3	0.4	0.2
F. Total transfers to producers:									
1. Total (1d+2d+3c+4d+5c)	Mil. R	115	76	54	-121	-20	268	-270	-225
2. Producer subsidy equivalents (F1/D)*100	Percent	17	16	8	-23	-2	22	-22	-26
G. Consumption	1,000 tons	1,971	2,377	2,228	2,207	2,315	2,732	2,493	2,424
H. Wholesale price	R/ton	280	280	303	329	365	398	398	448
I. Consumer cost (G*H)/1,000	Mil. R	552	666	675	726	845	1,088	993	1,085
J. Policy transfers to consumers:									
1. Price wedge--									
a. Wholesale price	R/ton	280	280	303	329	365	398	398	448
b. Border price, U.S. gulf port plus transportation	US$/ton	195	194	191	173	147	134	182	209
c. Border price, U.S. gulf port plus transportation	R/ton	211	216	274	379	334	272	412	547
d. Grain price support (1a-1c)*G/1,000	Mil. R	-135	-153	-64	109	-72	-344	34	240
e. Bread price support	Mil. R	182	194	268	194	181	147	147	132
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, equilibrium exchange rate	R/ton	237	243	290	411	375	316	431	564
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. R	49	64	35	70	95	120	48	41
K. Total transfers to consumers:									
1. Total (1d+1e+2d)	Mil. R	96	104	238	374	203	-77	229	413
2. Consumer subsidy equivalents (K1/I)*100	Percent	17	16	35	51	24	-7	23	38

ha. = Hectare.
R = Rand.
US$ = U.S. dollar.

Appendix table 2--Corn: Calculation of South Africa's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	4,198	4,078	4,028	3,913	4,054	4,029	3,657	3,778
B. Production	1,000 tons	8,503	4,318	4,714	8,295	8,321	7,342	7,251	12,442
C. Producer price	R/ton	134	167	217	217	233	252	258	262
D. Producer value (B*C)/1,000	Mil. R	1,140	721	1,021	1,797	1,937	1,850	1,867	3,254
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price plus marketing costs	R/ton	157	194	263	261	276	291	299	302
b. Export price	R/ton	137	187	233	247	188	171	325	300
c. Price support (1a-1b)*B/1,000	Mil. R	177	32	142	122	733	884	-186	28
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, U.S. gulf port plus transportation	US$/ton	137	168	162	139	108	95	142	143
d. Border price, U.S. gulf port plus transportation	R/ton	148	187	233	305	245	193	320	373
e. Border price, equilibrium exchange rate	R/ton	166	210	246	331	275	224	335	385
f. Exchange rate subsidy (2d-2e)*B/1,000	Mil. R	-149	-100	-63	-213	-251	-229	-109	-143
3. Fertilizer transfers--									
a. Field crop value	Mil. R	3,172	3,101	3,413	4,749	4,584	5,241	5,914	7,343
b. Fertilizer subsidy, all crops	Mil. R	12.0	10.6	3.5	3.5	2.5	2.0	1.0	0.0
c. Fertilizer subsidy ((D/3a)*3b)	Mil. R	4.3	2.5	1.0	1.3	1.1	0.7	0.3	0.0
4. Credit transfers--									
a. Government agricultural credit	Mil. R	2,604	3,420	4,600	5,642	6,219	6,597	7,237	8,104
b. Interest rate subsidy	Percent	6	6	7	5	5	4	4	4
c. Share of credit to corn	Percent	31	31	31	31	36	27	26	36
d. Credit subsidy (4a*(4b/100)*(4c/100))	Mil. R	49	64	94	79	101	72	74	118
5. Transportation transfers--									
a. Transportation subsidy	Mil. R	3	5	19	15	10	5	7	3
b. Corn share of subsidy	Percent	23	23	23	23	23	23	23	23
c. Transportation subsidy (5a*(5b/100))	Mil. R	0.7	1.2	4.5	3.4	2.4	1.2	1.6	0.7
F. Total transfers to producers:									
1. Total (1d+2d+3c+4d+5c)	Mil. R	82	-0	179	-7	586	730	-219	3
2. Producer subsidy equivalents (F1/D)*100	Percent	7	-0	18	-0	30	39	-12	0
G. Consumption, food	1,000 tons	3,394	3,261	2,963	2,594	2,508	2,721	2,655	2,669
GG. Consumption, feed	1,000 tons	3,421	3,377	2,601	2,722	2,556	2,697	2,854	3,473
H. Wholesale price, white	R/ton	155	170	225	247	308	310	322	363
HH. Wholesale price, yellow	R/ton	155	170	221	243	285	288	295	333
I. Consumer cost ((G*H)/1,000)+((GG*HH)/1,000)	Mil. R	1,058	1,129	1,239	1,300	1,503	1,620	1,697	2,124
J. Policy transfers to consumers:									
1. Price wedge--									
a. Export price	R/ton	137	187	233	247	188	171	325	300
b. Price support 1a-H*G/1,000+1a-HH*GG/1,000	Mil. R	-128	113	58	11	-552	-696	94	-281
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, official exchange rate	R/ton	148	187	233	305	245	193	320	373
d. Border price, equilibrium exchange rate	R/ton	166	210	246	331	275	224	335	385
e. Exchange rate subsidy (1c-2c)*B/1,000	Mil. R	120	154	74	137	153	169	83	70
K. Total transfers to consumers:									
1. Total (1b+2e)	Mil. R	-8	266	132	148	-399	-527	176	-211
2. Consumer subsidy equivalents (K1/I)*100	Percent	-1	24	11	11	-27	-33	10	-10

ha. = Hectare.
R = Rand.
US$ = U.S. dollar.

Appendix table 3--Sugar: Calculation of South Africa's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	393	406	412	407	412	402	389	381
B. Production, raw	1,000 tons	2,055	2,126	1,378	2,370	2,170	2,200	2,235	2,240
C. Producer price	R/ton	164	172	245	193	235	281	272	326
D. Producer value (B*C)/1,000	Mil. R	337	366	337	456	510	619	608	731
E. Policy transfers to producers:									
1. Price wedge--									
a. Border price, Caribbean plus transportation	US$/ton	317	164	211	116	124	164	181	257
b. Border price, Caribbean plus transportation	R/ton	343	183	303	255	282	333	409	672
c. Refining costs	R/ton	95	95	98	127	193	200	179	199
d. Price support ((C+1c)-1b)*B/1,000	Mil. R	-171	181	55	153	317	326	95	-329
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, equilibrium exchange rate	R/ton	383	205	320	276	316	387	428	693
d. Exchange rate subsidy (1b-2c)*B/1,000	Mil. R	-84	-48	-24	-51	-75	-118	-43	-46
3. Credit transfers--									
a. Government agricultural credit	Mil. R	2,604	3,420	4,600	5,642	6,219	6,597	7,237	8,104
b. Interest rate subsidy	Percent	6	6	7	5	5	4	4	4
c. Share of credit to sugar	Percent	3	3	3	3	3	3	3	3
d. Credit subsidy (3a*(3b/100)*(3c/100))	Mil. R	5	6	9	8	8	8	9	10
4. Transportation transfers--									
a. Transportation subsidy	Mil. R	3	5	19	15	10	5	7	3
b. Sugar share of subsidy	Percent	0	0	0	0	0	0	0	0
c. Transportation subsidy (4a*(4b/100))	Mil. R	0	0	0	0	0	0	0	0
F. Total transfers to producers:									
1. Total (1d+2d+3d+4c)	Mil. R	-250	139	40	110	251	216	61	-365
2. Producer subsidy equivalents (F1/D)*100	Percent	-74	38	12	24	49	35	10	-50
G. Consumption	1,000 tons	1,152	1,195	1,225	1,272	1,305	1,300	1,433	1,360
H. Wholesale price	R/ton	308	342	390	437	516	612	725	860
I. Consumer cost (G*H)/1,000	Mil. R	355	409	478	556	673	795	1,039	1,170
J. Policy transfers to consumers:									
1. Price wedge--									
a. Raw price, Durban	R/ton	308	345	387	420	437	524	652	737
b. Border price, U.S. gulf port plus transportation	US$/ton	317	164	211	116	124	164	181	257
c. Border price, U.S. gulf port plus transportation	R/ton	343	183	303	255	282	333	409	672
d. Price support (1c-1a)*G/1,000	Mil. R	40	-194	-103	-210	-202	-249	-348	-87
2. Exchange rate adjustment--									
a. Official exchange rate	R/US$	1.1	1.1	1.4	2.2	2.3	2.0	2.3	2.6
b. Equilibrium exchange rate	R/US$	1.2	1.3	1.5	2.4	2.5	2.4	2.4	2.7
c. Border price, equilibrium exchange rate	R/ton	383	205	320	276	316	387	428	693
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. R	47	27	21	27	45	70	27	28
K. Total transfers to consumers:									
1. Total (1d+2d)	Mil. R	87	-167	-82	-183	-157	-179	-321	-59
2. Consumer subsidy equivalents (K1/I)*100	Percent	24	-41	-17	-33	-23	-23	-31	-5

ha. = Hectare.
R = Rand.
US$ = U.S. dollar.

Tanzania

By Margaret Missiaen and Kathy Lindert

Economic and Agricultural Developments

Tanzania's economic policy has been characterized by three distinct policy regimes: a brief, market-oriented period following independence in 1961, a state-monopoly regime with market suppression between 1967 and 1985, and a return to liberalized markets under the Economic Recovery Program (ERP) adopted in 1986. The Arusha Declaration of 1967 dramatically reversed the economic climate from a neutral, free-market system to an inward-looking regime based on strict government control, domestic production of manufactured goods to substitute for imports, and a socialist doctrine. The policy objectives of this regime were to achieve self-sufficiency in food production, to develop infant industries and human resources, and to reduce dependence on foreign investment. State control reached most sectors and virtually all stages of production, marketing, and distribution. Policy instruments included price intervention, parastatal creation, prohibitive taxes, licensing, quotas, rationing, and restrictions on internal trade.

After impressive growth in the 1960's and early 1970's, Tanzania's economy steadily declined. The crisis peaked in 1982, forcing policymakers to reevaluate their system of state controls. The Government's economic restructuring program, begun in 1984, was followed by the World Bank Economic Recovery Program (ERP), adopted in 1986 and expanded by the Economic and Social Action Program (ESAP) in 1989.

The ERP included both monetary and fiscal policy reforms. Its key objectives were to increase output, to reduce inflation, and to restore balance to the country's external account. Policy measures included exchange rate adjustments, improved agricultural production incentives, trade liberalization, and infrastructure development. This study attempts to quantify the effects of these policy reforms on agricultural incentives.

The ERP achieved modest success in the second half of the 1980's. Real growth in gross domestic product (GDP) rebounded from an average of 1 percent during 1980-85 to an average of 4.5 percent since the implementation of the ERP in 1986. With a population growth rate of 3.3 percent a year, per capita GDP growth rates were positive in the late 1980's (11).[1]

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[1] Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

Domestic expenditures, however, grew faster than GDP and resulted in increased dependency on external financing. Between 1966 and 1990, imports increased fivefold, while exports grew at less than half that rate. The resulting balance-of-trade deficit was largely offset by external assistance. The external resource flow grew from 8 percent of GDP in 1985 to 31 percent in 1989. Private consumption expenditures accounted for 96 percent of GDP and public expenditures for 11 percent, with savings a negative 6 percent of GDP in 1989 (11).

The most impressive recovery has been in Tanzania's agriculture. Agricultural production increased 4-5 percent per year during 1986-90. In recent years, bumper harvests have been brought in. More favorable weather conditions as well as incentive structures account for this growth. Agriculture's share of GDP has climbed steadily, a reversal of the historical trend. The sector now generates 46 percent of national output and employs 90 percent of the workforce. Smallholders dominate agricultural production, accounting for 85 percent of total output. Output from this subsector is composed principally of corn, sorghum, and millet. These small farms also account for most rainfed farming. Estate farming concentrates on cash crop production of wheat and rice. Irrigated commercial wheat and rice production is dominated by large state farms. The Canadian-assisted National Agriculture and Food Corporation (NAFCO) wheat farms supply 30-40 percent of wheat consumption, while estate farming provides 80 percent of marketed rice (9).

Agriculture generates 80 percent of total export earnings. Tanzania is a net exporter of agricultural commodities, with $66.8 million in agricultural imports and $283.1 million in exports in 1989. Traditional cash crops include coffee, cotton, and cashews. The ERP, in an attempt to diversify Tanzania's export base, is also providing incentives to encourage nontraditional exports, such as starches, horticultural products, and light manufactures. Corn, the main staple in Tanzania, has been exported for the past few years. The other grain staples are rice and wheat. Tanzania is a net importer of wheat, and imports rice during deficit years. Most of these imports are donor supported.

Policies in the 1980's

The economic decline in the 1970's and early 1980's forced policymakers to reform the inward-looking, interventionist economic climate in Tanzania. General liberalization began in 1986 with the adoption of the ERP.

Macroeconomic and Trade Policy Developments

Both monetary and fiscal policy reforms are included on the ERP agenda. The Tanzanian Government is simplifying its tax system to make tax collection more effective. Expenditures are being geared toward priority areas such as infrastructure, capital maintenance, and social services.

Monetary policy reforms have only recently been implemented. In early 1991, the Tanzanian Government began opening up the financial system to private competition. Interest rate regulation was relaxed and simplified to incorporate a single maximum lending rate of 31 percent (*11*).

The main financial reforms were conducted through exchange rate adjustments. Exchange rate overvaluation severely hindered growth in the early 1980's by reducing exports. To correct for overvaluation, the Tanzanian currency (shilling) was devalued rapidly, from 17.5 shillings to the dollar in 1985 to 32.7 in 1986. For fear of fueling inflation, however, the Government slowed the pace of devaluation in 1987 and 1988, and the shilling even appreciated slightly against major currencies. Further adjustments devalued the official rate to 143.4 shillings to the dollar in 1989 (*4*).

In a move to ease foreign exchange constraints, the Own Funds Import Scheme was adopted in 1984, granting free import licenses to those who do not request foreign currency from the Bank of Tanzania. In 1988, external trade was further liberalized with the Open General License (OGL) facility supported by the World Bank. This system initially allowed certain essential items to be imported. The list was expanded several times, and by 1991, only a few import items, such as nuclear reactors, military equipment, precious stones, cigarettes, and alcoholic beverages were prohibited. Licenses are still required for external trade, but the role of marketing boards in controlling trade channels has been significantly reduced. Customs tariffs were also lowered under the ERP from prohibitive levels to a maximum level of 60 percent. Also, to encourage diversification of exports, exporters of nontraditional products could retain up to 50 percent of export earnings (*9*).

Agricultural Policy Developments

Recent changes in Tanzanian agricultural policy reflect the ERP strategy of agricultural-led development. An explicit objective of the ERP is to improve agricultural output through improved producer incentives.

Much of the government intervention that characterized the agricultural sector since the Arusha Declaration has been curtailed. Parastatals, such as the National Milling Corporation (NMC), the Government's grain marketing board, no longer monopolize marketing channels. The role of the NMC has been reduced to buyer and seller of last resort. Cooperative unions and private traders have gradually replaced the NMC and other parastatals. Producer prices have been decontrolled for many grains and are now set as indicative prices that guide farmers in negotiating sales. The liberalization of cot-

ton and coffee markets, however, has lagged behind that of other sectors, with reforms implemented in July 1990.

Marketing inefficiencies, input shortages, foreign exchange and liquidity constraints, payment delays, and weak infrastructure continue to hinder agricultural growth. Although exchange rate devaluations have made agricultural exports more competitive, higher revenues have not always been passed on to producers. Devaluation has also made imports of essential inputs more expensive.

Producer Pricing Policies

Although the Government has historically intervened for lower income groups in the pricing of staple foods, it is currently attempting to phase out such policies in favor of total price liberalization. This goal is intended to enable farmers to cover their costs, increase marketed output, and reach self-sufficiency in staple food production. The Government set producer prices for basic commodities before 1986, adjusting these prices annually in response to market conditions and changing production costs.

When growing food shortages and a deteriorating economy appeared in the early 1980's, the Government allowed cooperatives to participate in marketing activities. In 1982/83, a dual pricing system for low- and high-potential producing areas was adopted. In the following years, price and marketing regulation policies were modified in an attempt to reduce government intervention.

Official pricing policy changed dramatically following the liberalization of the grain trade. Between 1986 and 1990, maize producer prices increased 18 percent annually, rice prices, 25 percent, and wheat, 37 percent. However, the gains for maize and rice were less than the inflation rate, which averaged 30 percent a year from 1986 to 1990 (*9*).

Producer price controls for sorghum, millet, and cassava were removed in 1987. Official prices of all other grains became minimum producer prices paid by the cooperatives. Prices at the other stages of the marketing chain could be freely negotiated, and the official consumer price was eliminated. The official minimum producer price was replaced by the system of indicative prices in the 1990/91 marketing season. Actual prices paid to farmers now depend on current market conditions. However, government marketing agents are still obligated to buy all offered commodities at the official price.

In recent years, the Government has attempted to adjust producer prices for export crops to reflect world market conditions. As a result, producer prices for coffee and cotton were increased several times during the 1980's. Although inflation eroded any gain for cotton producers, real coffee prices increased.

Marketing Policies

Until the early 1980's, the marketing of farm products, both cash and food crops, was the responsibility of state-run mar-

keting boards. Inefficiencies in this system were identified as the main reason for the agricultural sector's low productivity. A gradual transition of the marketing system from a government-controlled, single channel to a multichannel operation consisting of both government and private agents was undertaken. The reforms attempted to improve the operation of the marketing system, in which inefficiencies had resulted in low prices, delayed payments to producers, and untimely delivery of inputs. Export quality had also deteriorated because of processing and shipping bottlenecks.

The Government abolished permit requirements for internal food grain movements in the mid-1980's. Cooperatives, abolished in the mid-1970's, were reestablished, and relations between these and parastatals were redefined. Reform of the grain marketing system began in 1984. Individuals were permitted to move grain across regional boundaries in lots of less than 500 kilograms. All weight restrictions on the interregional movement of grain had been eliminated by March 1987, and private traders began to compete with the NMC. Starting in the 1988/89 marketing season, regional cooperatives were allowed to sell directly to private traders, although market outlets for farmers were still confined to the primary cooperative societies. The following season, farmers were allowed to sell directly to traders. This reform effectively removed the last obstacle to fully liberalized grain trade. Also, NMC's access to crop financing was cut off because of its large debt arrears to the banking system, which effectively eliminated it from the market.

Direct government intervention under the new liberalization policies is limited to the operation of the Strategic Grain Reserve, a 150,000-ton government maize reserve used for emergency food distribution and buffer stock operations.

The Government is liberalizing the marketing of cash crops. In 1990, government marketing boards for cotton, cashew nuts, and coffee stopped buying and selling these crops. Fourteen of 16 regional buying centers were closed, all departments were reorganized, and staffs were reduced. Marketing boards are being restructured to provide basic services, such as administration of export auctions or tender procedures, provision of market intelligence, and marketing agent services.

The Ministry of Local Government Cooperatives and Marketing was established in late 1987 to eliminate the overlapping of responsibilities among government agencies. By 1988, Tanzania had 24 cooperative unions and over 4,000 primary cooperative societies. In addition to such essential activities as supplying farm inputs, marketing, and primary processing, the cooperatives have been involved in wholesale and retail sales, export marketing, advanced processing, and other activities that have strained budgets and management capacities.

Overall, the Government has made modest progress in improving parastatal performance by reducing direct budget subsidies, making more competitive the economic environment in which parastatals operate, and encouraging managers to operate in a more commercial manner.

Input Policies

The Government began subsidizing fertilizer and other inputs in the mid-1970's. The fertilizer price paid by farmers was about one-third the international price and covered only transportation and handling costs. The ERP has now granted import duty exemptions for fertilizers and agricultural machinery and equipment to increase input availability, but foreign exchange constraints and weak distribution channels continue to delay deliveries. Input distribution has been liberalized since 1987.

Although high fertilizer subsidies and fixed pricing led to market distortions and inefficient input use, these policies were continued through much of the 1980's. Domestic fertilizer prices were aligned with world prices in 1984 but held constant in 1985. A combination of higher domestic prices and lower world prices reduced the subsidies in 1987. In 1988, subsidies increased, as the Government failed to transmit world price increases to the domestic market. In 1990, the Government reduced fertilizer subsidies from 80 percent to 55 percent of the cost. This policy change resulted in three price increases during the 1990/91 season.

Parastatals, cooperatives, and the private sector compete in the supply and distribution of fertilizer. Agrochemicals can be imported by private firms under the OGL system, but financing has been difficult to obtain because of a banking crisis. Alternatively, fertilizer is imported by the Tanzania Fertilizer Company and distributed through a growing system of private traders. These traders handled about 50 percent of total supplies in the 1990/91 marketing year. All imported fertilizers are currently provided by foreign donors.

The availability of credit is critical to the success of the agricultural sector. However, the government credit system for crop purchases and input supply is on the verge of collapse. Because of the fungibility of loans, farm credit has been frequently used for nonfarm activities. Poor farm loan recovery rates and political interference in the credit system have forced institutions to limit funds. Recent policy changes have given cooperatives a major role not only in marketing but as concomitant credit operators. Although initially successful, cooperatives have recently been constrained by funding shortages and erratic government policy changes.

Tanzania's financial system is public, although recent policy initiatives have called for increased privatization. Agricultural lending expanded under the ERP and now accounts for 60 percent of commercial credit allocations. The Government appears committed to increased agricultural lending. However, the availability of credit in general and the availability of credit to nonagricultural sectors in particular has been severely restricted except in cases of adequate collateral (9).

Consumer Policies

Official consumer prices are also set and revised annually by the Government of Tanzania. Consumer price subsidies were introduced in 1976 and primarily benefited urban consumers.

These subsidies continued into the 1980's. Until then, policy favored high government intervention, with self-sufficiency in food production as a primary goal. National marketing boards, such as the NMC, controlled 75 percent of grain trade. Open market prices tended to be double or triple official consumer prices. ERP reforms, however, refocused policy objectives on privatization and decontrol of retail pricing. Consumer prices increased to cover higher producer price margins as well as transport and marketing costs. Official retail prices under the ERP tend to be higher than open market prices except during offseason periods when stocks are low. Domestic grain marketing has been transferred from parastatal monopolies to cooperatives and private traders. About 70 percent of all agricultural commodities are now traded on the open market at generally lower, unofficial prices. High official consumer prices, hence, effectively serve as maximum indicative prices (9).

Estimation of Policy Intervention in Agriculture

Policies that affect Tanzanian producers and consumers were estimated for five crops, using producer subsidy equivalents (PSE's) and consumer subsidy equivalents (CSE's). The commodities chosen for evaluation include three staple crops, wheat, corn, and rice, as well as two cash crops, coffee and cotton.

Corn is the main staple in the Tanzanian diet, contributing 31 percent of caloric intake. Tanzania has been a net exporter of corn from 1987 to 1990. Rice accounts for 7 percent of caloric intake and has been imported during deficit years, mainly as food aid. Wheat consumption is becoming more important, particularly in urban areas. It represents 1 percent of the total diet in Tanzania, with a larger share in urban areas. Imports account for a third of wheat consumption and are mainly donor supported (3).

The two cash crops are heavily traded. Virtually all coffee produced (98 percent) is exported, as is two-thirds of Tanzanian cotton lint. Together, coffee and cotton generated 82 percent of total agricultural export earnings in 1989 (4).

An explicit objective of the ERP is to improve incentives for agricultural production. The PSE estimates for Tanzania attempt to quantify the effect of key policy reforms on these incentives. PSE's include agricultural policies that control producer prices and fertilizer subsidies. These estimates also account for the effect of exchange rate intervention from 1982 to 1989.

Many policies that affect producer incentives were not quantified in PSE estimates. Severe input shortages, delayed payments, limited credit, and foreign exchange constraints plague the Tanzanian economy and discourage production. Since the implementation of ERP reforms, eased import restrictions have expanded the availability of inputs and consumer goods, boosting producer incentives. Privatization of marketing and trade liberalization have also increased efficiency and improved the production environment.

CSE estimates include measures of consumer price intervention. An additional measure to account for exchange rate effects is calculated and combined with price policy transfers to derive aggregate CSE's.

Several policies affecting consumer incentives and purchasing power were omitted from CSE measures because of insufficient data. Transport and storage bottlenecks and internal grain movement restrictions influence marketing costs. Also, the effects of privatization were not quantified in CSE estimates. Before ERP reforms were implemented, the NMC controlled 75 percent of grain trade. Official retail prices were thus fairly accurate statistics for CSE estimation. With ERP, however, a larger share of marketed output was sold on the open market. By 1989, about 70 percent of marketed output was privately traded. Because official retail prices were used in CSE calculations, price policy taxation is somewhat biased for the late 1980's.

Results for Producers

With the exception of 1985 and 1986, Tanzanian PSE's were negative, indicating a net tax to producers (table 1). Cash crops, especially coffee, tended to be taxed more than food crops. Such taxation is particularly evident for years following the drought of 1983/84, when price differentials favored food crops over exports.

Domestic price intervention and foreign exchange policies governed the results of PSE estimates. The price component of total PSE's was positive for most years, indicating that producer prices were generally higher than international reference prices. These subsidies were offset by exchange rate overvaluation, which taxed producers in all years.

Results by Commodity

Results from the three staples showed similar trends: negative but increasing PSE's in the early years, which indicated declining taxes, subsidies in the mid-1980's, and a return to taxation in recent years (table 2).

During the drought of the early 1980's, the Tanzanian Government attempted to boost food production by raising official producer prices. Price policy transfers therefore increased during this period, especially for corn and rice. These price subsidies were offset, however, by exchange rate overvaluation, causing total policy transfers to be negative (fig. 1).

In the mid-1980's, exchange rate devaluations and more favorable pricing policies resulted in large transfers to producers. Domestic producer prices were adjusted upward faster than world prices. These positive effects offset the effect from the elimination of fertilizer subsidies from 1984 to 1986.

Despite ERP efforts to boost producer incentives, price supports fell dramatically in the later years, as domestic prices failed to keep up with rising world grain prices. The pace of devaluation also slowed, increasing overvaluation. Despite a resumption of fertilizer subsidies, the net result was a tax on

Table 1—Tanzania: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Fertilizer subsidy	Mil. Sh.	274	148	0	-206	-231	229	493	873
Price subsidy	Mil. Sh.	3,347	4,418	10,892	18,573	24,907	21,136	-6,709	-25,947
Foreign exchange	Mil. Sh.	-20,740	-19,431	-16,578	-10,568	-11,003	-26,019	-25,501	-4,989
Policy transfers by commodity:									
Wheat	Mil. Sh.	-270	-251	-73	201	240	-58	-778	-992
Corn	Mil. Sh.	-7,066	-6,909	-951	5,832	9,591	1,464	-15,374	-18,321
Rice	Mil. Sh.	-2,529	-1,571	670	3,445	6,005	5,060	-1,743	-2,689
Cotton	Mil. Sh.	-1,796	-2,005	-1,469	1,501	2,601	-5,275	-3,233	-888
Coffee	Mil. Sh.	-5,459	-4,130	-3,863	-3,179	-4,763	-5,846	-10,589	-7,173
PSE by commodity:									
Wheat	Percent	-186	-113	-20	46	46	-9	-99	-79
Corn	Percent	-244	-190	-12	53	70	8	-73	-53
Rice	Percent	-263	-112	31	103	119	55	-16	-25
Cotton	Percent	-313	-240	-115	91	72	-112	-77	-29
Coffee	Percent	-812	-497	-336	-209	-223	-207	-186	-112
Total policy transfers	Mil. Sh.	-17,120	-14,866	-5,687	7,799	13,674	-4,655	-31,718	-30,063
Value to producers	Mil. Sh.	5,245	6,919	12,696	17,879	25,062	36,561	42,401	55,933
Total commodity PSE	Percent	-326	-215	-45	44	55	-13	-75	-54

Sh. = Tanzanian shilling.
PSE = Producer subsidy equivalent.

grain production. Compared with price and exchange rate components, the effects of fertilizer subsidies were minor.

The extent to which grains are traded on the open market rather than through official channels is not quantified in PSE measures. Yet, the structure of the open market has a profound impact on producer incentives. In the early 1980's, parallel market prices of grains were often more than double official price levels. Improved efficiency from privatization, more favorable weather conditions, and increased availability of consumer goods and inputs explain the bumper crops of the late 1980's, despite the increase in taxes.

The Tanzanian Government regulated export crops more than food crops during the 1980's. Single-channel marketing monopolies for coffee and cotton were not removed until July 1990. Many policies affecting cotton and coffee producer incentives had to be omitted from the PSE estimates because of insufficient data. Storage and infrastructure bottlenecks have crippled the export sector and made Tanzania a relatively high-cost supplier. Given Tanzania's high dependence on foreign inputs, foreign exchange constraints have resulted in low input and fertilizer use, despite government subsidies. Large exchange rate devaluations have further increased production costs. Payment delays lasting up to a year after delivery have also reduced production incentives.

Cotton production is dominated by smallholders. The price system is designed to promote quality exports with higher prices for better grades. Inputs are generally subsidized and seed is provided free of charge. Reforms under ERP allow traders to retain 25 percent of export earnings to boost cotton exports. Cotton has increased in importance in total export earnings, generating nearly the same share as coffee in 1990 (9).

Producers of cotton were taxed in all years except 1985 and 1986. These taxes declined over the years, however, averaging 275 percent of producer revenue in 1982-83 and 53 percent in 1988-89. While official producer prices were held

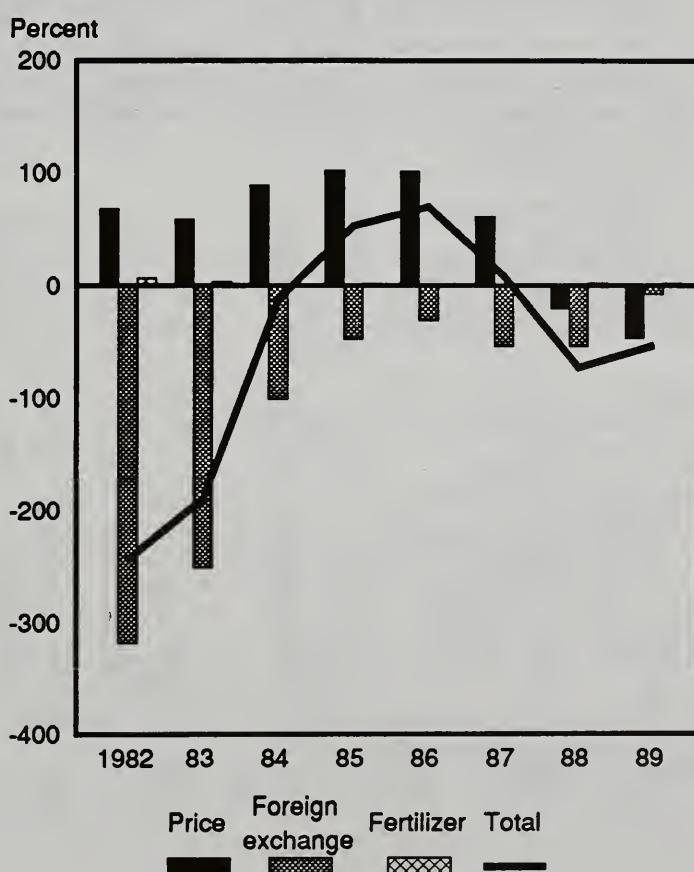Figure 1

Tanzania: Corn producer subsidy equivalent

Table 2--Tanzania: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	58	74	83	72	72	75	76	97
Producer price	Sh./ton	2,500	3,000	4,500	6,000	7,200	9,000	10,350	13,000
Value to producers	Mil. Sh.	145	222	374	432	518	675	787	1,261
Policy transfers to producers--									
Fertilizer subsidy	Mil. Sh.	8	4	-0	-6	-6	6	14	24
Price subsidy	Mil. Sh.	116	175	320	425	432	335	-318	-900
Foreign exchange	Mil. Sh.	-394	-431	-394	-219	-186	-400	-474	-116
Total policy transfers	Mil. Sh.	-270	-251	-73	201	240	-58	-778	-992
PSE (per unit value)	Percent	-186	-113	-20	46	46	-9	-99	-79
PSE (per unit quantity)	Sh./ton	-4,661	-3,396	-884	2,786	3,339	-778	-10,235	-10,226
	US$/ton	-501	-306	-58	159	102	-12	-103	-71
Corn:									
Level of production	1,000 tons	1,654	1,651	1,939	2,093	2,210	2,359	2,339	3,126
Producer price	Sh./ton	1,750	2,200	4,000	5,226	6,223	8,077	9,000	11,000
Value to producers	Mil. Sh.	2,895	3,632	7,756	10,938	13,753	19,054	21,051	34,386
Policy transfers to producers--									
Fertilizer subsidy	Mil. Sh.	183	99	-0	-138	-154	153	330	585
Price subsidy	Mil. Sh.	1,972	2,115	6,865	11,154	13,992	11,625	-4,347	-16,084
Foreign exchange	Mil. Sh.	-9,221	-9,123	-7,816	-5,184	-4,246	-10,314	-11,357	-2,823
Total policy transfers	Mil. Sh.	-7,066	-6,909	-951	5,832	9,591	1,464	-15,374	-18,321
PSE (per unit value)	Percent	-244	-190	-12	53	70	8	-73	-53
PSE (per unit quantity)	Sh./ton	-4,272	-4,185	-490	2,786	4,340	621	-6,573	-5,861
	US$/ton	-459	-377	-32	159	133	10	-66	-41
Rice:									
Level of production	1,000 tons	320	350	356	427	547	644	615	570
Producer price	Sh./ton	3,000	4,000	6,000	7,828	9,254	14,400	17,300	19,000
Value to producers	Mil. Sh.	960	1,400	2,136	3,343	5,062	9,274	10,640	10,830
Policy transfers to producers--									
Fertilizer subsidy	Mil. Sh.	13	7	-0	-10	-11	11	24	43
Price subsidy	Mil. Sh.	1,048	1,681	2,977	5,133	8,136	10,982	4,457	-1,638
Foreign exchange	Mil. Sh.	-3,591	-3,259	-2,307	-1,679	-2,120	-5,933	-6,225	-1,094
Total policy transfers	Mil. Sh.	-2,529	-1,571	670	3,445	6,005	5,060	-1,743	-2,689
PSE (per unit value)	Percent	-263	-112	31	103	119	55	-16	-25
PSE (per unit quantity)	Sh./ton	-7,903	-4,488	1,883	8,067	10,977	7,857	-2,835	-4,718
	US$/ton	-850	-404	123	461	336	122	-29	-33
Cotton lint:									
Level of production	1,000 tons	43	48	51	42	71	81	63	36
Producer price	Sh./ton	13,373	17,463	25,075	38,806	50,448	58,060	66,716	83,582
Value to producers	Mil. Sh.	574	834	1,279	1,643	3,598	4,729	4,226	3,026
Policy transfers to producers--									
Fertilizer subsidy	Mil. Sh.	35	19	-0	-26	-29	29	62	110
Price subsidy	Mil. Sh.	592	714	1,110	2,475	4,343	347	-379	-704
Foreign exchange	Mil. Sh.	-2,422	-2,737	-2,579	-947	-1,713	-5,651	-2,916	-293
Total policy transfers	Mil. Sh.	-1,796	-2,005	-1,469	1,501	2,601	-5,275	-3,233	-888
PSE (per unit value)	Percent	-313	-240	-115	91	72	-112	-77	-29
PSE (per unit quantity)	Sh./ton	-41,857	-41,997	-28,813	35,459	36,473	-64,769	-51,039	-24,518
	US$/ton	-4,501	-3,783	-1,883	2,026	1,115	-1,007	-514	-171
Coffee:									
Level of production	1,000 tons	56	50	49	54	42	43	57	51
Producer price	Sh./ton	12,000	16,800	23,500	28,200	50,750	66,000	99,170	126,000
Value to producers	Mil. Sh.	672	832	1,152	1,523	2,132	2,830	5,697	6,430
Policy transfers to producers--									
Fertilizer subsidy	Mil. Sh.	35	19	-0	-26	-29	29	62	110
Price subsidy	Mil. Sh.	-381	-267	-381	-614	-1,995	-2,153	-6,123	-6,621
Foreign exchange	Mil. Sh.	-5,112	-3,881	-3,483	-2,539	-2,739	-3,721	-4,529	-662
Total policy transfers	Mil. Sh.	-5,459	-4,130	-3,863	-3,179	-4,763	-5,846	-10,589	-7,173
PSE (per unit value)	Percent	-812	-497	-336	-209	-223	-207	-186	-112
PSE (per unit quantity)	Sh./ton	-97,485	-83,435	-78,845	-58,877	-113,415	-136,325	-184,324	-140,552
	US$/ton	-10,482	-7,517	-5,153	-3,364	-3,468	-2,120	-1,856	-980

Sh. = Tanzanian shilling.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

above world prices through 1987, these price policy transfers did not offset exchange rate overvaluation, which taxed producers throughout the period.

Coffee production was heavily taxed during the entire period (fig. 2). Coffee trade was regulated by marketing boards and

Tanzania: Coffee producer subsidy equivalent

Percent

Price ▆ Foreign exchange ▒ Total ▬▬
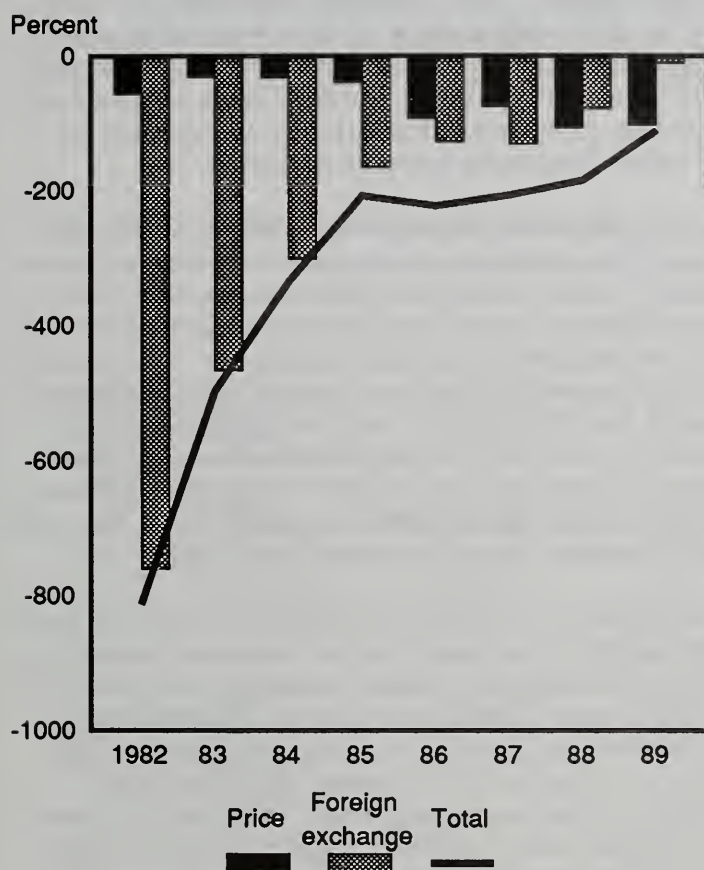
International Coffee Agreement quotas until 1989. Official domestic prices were pegged well below world prices. Exchange rate overvaluation also taxed exports, resulting in negative overall PSE's throughout the period. Coffee producers were charged the same average input fee regardless of use. Low profit margins failed to cover costs. ERP reforms allowed for 25-30 percent retention of export earnings to boost incentives. However, because of low relative incentive schemes, coffee exports declined in importance from 40 percent of export value in 1985 to 20 percent in 1990 (4).

Results by Policy

From 1982 to 1986, the Tanzanian Government increased producer prices to boost incentives during the drought years. Exchange rate overvaluation offset these subsidies, however, and resulted in an overall tax. Devaluations under the ERP made exports more competitive. But, the rate of devaluation slowed in later years, and the shilling even appreciated slightly against major currencies in 1987 and 1988. The Tanzanian Government also failed to transmit world price increases to producers in 1988 and 1989. Although these measures preserved price stability, they resulted in an aggregate tax on producers and thus conflicted with ERP efforts to boost incentives.

Fertilizer was also subsidized in most years except in 1984-86, when these transfers were abolished. Compared with price and exchange components, the effects of fertilizer subsidies were minor.

Results for Consumers

On average, Tanzanian consumers were subsidized in the early 1980's and then taxed under the ERP (table 3). Policy goals have traditionally focused on self-sufficiency of food production, though recent objectives have favored privatization and trade liberalization with reduced food subsidies. Al-

Table 3--Tanzania: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. Sh.	-3,925	-5,401	-8,994	-14,827	-23,927	-17,543	-13,600	-2,966
Foreign exchange		14,078	14,151	11,756	7,407	6,435	15,465	15,930	3,205
Policy transfers by commodity:									
Wheat	Mil. Sh.	555	308	-340	-759	-1,331	-1,352	-2,649	-4,547
Corn	Mil. Sh.	6,825	6,193	2,990	-4,604	-13,189	824	7,687	12,433
Rice	Mil. Sh.	2,032	1,585	-782	-2,073	-2,807	-2,509	-2,897	-6,999
Cotton	Mil. Sh.	741	664	893	16	-166	959	189	-649
CSE by commodity:									
Wheat	Percent	123	45	-24	-48	-58	-41	-46	-55
Corn	Percent	120	80	29	-30	-52	3	20	28
Rice	Percent	175	84	-20	-44	-39	-19	-17	-29
Cotton	Percent	346	265	208	3	-16	60	9	-19
Total policy transfers	Mil. Sh.	10,153	8,750	2,762	-7,420	-17,492	-2,079	2,329	240
Cost to consumers	Mil. Sh.	7,511	10,529	16,080	22,243	35,770	43,555	63,766	79,511
Total commodity CSE	Percent	135	83	17	-33	-49	-5	4	0

Sh. = Tanzanian shilling.
CSE = Consumer subsidy equivalent.

though regions of food deficit exist, Tanzania is not a food-deficit country, and it should be self-sufficient in most grains. Consumption needs often exceed production, however, and imports are needed to fill gaps in requirements. Because of foreign exchange constraints, however, much of these imports are donor supported, and commercial grain imports carry levies of 25-30 percent.

Domestic price controls and foreign exchange policies governed CSE measures. The price wedge was negative for all years, indicating that official retail prices were higher than world prices. Exchange rate overvaluation, however, subsidized consumption throughout the period and was large enough to offset price policy taxes in the early years.

Results by Commodity

Corn, the most important food item, is consumed as corn meal and contributes 31 percent of caloric intake. Corn consumption was subsidized during 1982-84 and 1987-89 (fig. 3) (table 4). Exchange rate overvaluation subsidized consump-tion and offset taxation from high official consumer prices. Devaluations under the ERP reduced purchasing power of food buyers. Domestic prices continued to rise, despite falling world prices, causing aggregate corn CSE's to plunge and become negative. The Tanzanian Government did not anticipate declining world prices and was slow to respond. CSE's recovered in later years, as devaluation

Figure 3

Tanzania: Corn consumer subsidy equivalent

slowed, and world price rises overtook official retail price increases.

Wheat and rice CSE's followed very similar trends. Tanzania is not self-sufficient in wheat and rice production and has had to rely on imports, mainly donor supported, to meet its needs. Overvalued exchange rates increased purchasing power in the early 1980's, subsidizing wheat and rice consumption, and offsetting price policy taxation. ERP liberalization reforms turned net transfers into taxes, and CSE's became negative in 1984. Consistent with stated ERP goals of privatization and reduction of consumer subsidies, retail prices increased to cover higher producer price margins and costs of transport, marketing, and devaluation. Official retail prices rose above parallel market prices. Devaluations further reduced purchasing power of consumers.

Domestic cotton lint consumption claims only a minor share of production, with most cotton exported to earn foreign exchange. The bulk of lint consumption is used as an intermediary good for the domestic textile industry. The main users are the Friendship Textile Mill and the Sunflag Mill, which together claim 45 percent of the domestic market. Total installed mill capacity was 16,000 tons in 1989, but actual use was constrained by power supply interruptions and other complications. Low textile production and foreign exchange constraints on imports translate into unsatisfied domestic demand. Tanzania has thus become a major importer of used clothing.

Cotton trade was monopolized by parastatals until July 1990, when marketing was turned over to cooperative societies. Price policy taxed consumption, on average, except in 1984 and 1987, when world prices rose faster than official consumer prices. Exchange rate overvaluation subsidized consumption during most of the period. Aggregate cotton CSE's fluctuated considerably from 1982 to 1989. On average, domestic cotton consumption was subsidized. In 1986 and 1989, however, price wedge taxation, coupled with exchange rate devaluation, resulted in negative CSE's.

Results by Policy

From 1982 to 1984, exchange rate overvaluation offset retail price taxation, resulting in an overall subsidy to consumers. These subsidies became negative with the implementation of ERP reforms. Government efforts to reduce consumer subsidies resulted in an increase in retail prices to cover transport and marketing costs. Also, exchange rate devaluations reduced the purchasing power of Tanzanian consumers. These policy reforms resulted in an overall tax on consumption. This tax was reduced somewhat in the late 1980's, when devaluation slowed, and world prices rose faster than official retail price adjustments.

Conclusions

Tanzania's agricultural growth under the ERP has been impressive. Two main factors account for this recovery. First, weather conditions have improved. Second, the ERP improved the overall incentive structure. However, many of
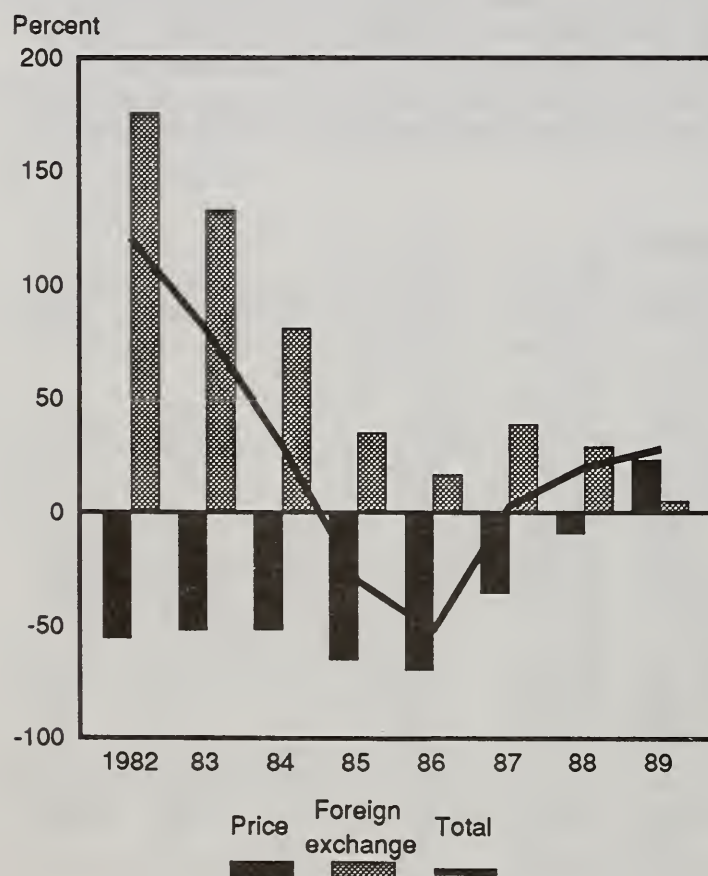
these improvements have not been incorporated into this report's PSE estimates for want of sufficient data. Increased availability of inputs and consumer goods boosted incentives. Trade liberalization and increased efficiency of marketing channels were also important steps in providing a more favorable production environment in Tanzania. Consumer subsidies have been reduced, and CSE's in recent years are negative, though policy proposals under ERP II indicate plans to reverse this taxation.

The Government has accelerated exchange rate and trade reforms to improve the allocation of foreign exchange and the competitiveness of the Tanzanian economy. The first foreign

exchange bureaus were licensed in April 1992. They are allowed to buy and sell foreign exchange at freely negotiated rates.

The Government continues to liberalize agricultural marketing. The current goals are to provide incentives for agricultural production and exports and to raise rural incomes. With the exception of five traditional export crops (coffee, cotton, tea, tobacco, and pyrethrum), farmers are free to sell their crops to any buyer. Cashew marketing was opened to private traders for the 1991/92 season. Agreement has been reached in the cotton sector to establish the first private ginning company.

Table 4--Tanzania: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	118	125	142	133	132	135	120	127
Wholesale price	Sh./ton	3,822	5,464	9,997	11,793	17,399	24,313	47,940	65,679
Cost to consumers	Mil. Sh.	451	683	1,420	1,568	2,297	3,282	5,753	8,341
Policy transfers to consumers--									
Price subsidy	Mil. Sh.	-247	-419	-1,014	-1,163	-1,671	-2,072	-3,397	-4,699
Foreign exchange	Mil. Sh.	802	727	673	405	340	720	748	153
Total policy transfers	Mil. Sh.	555	308	-340	-759	-1,331	-1,352	-2,649	-4,547
CSE (per unit value)	Percent	123	45	-24	-48	-58	-41	-46	-55
CSE (per unit quantity)	Sh./ton	4,702	2,464	-2,396	-5,704	-10,081	-10,018	-22,078	-35,800
	US$/ton	506	222	-157	-326	-308	-156	-222	-250
Corn:									
Level of consumption	1,000 tons	1,788	1,846	2,056	2,165	2,193	2,244	2,306	2,512
Wholesale price	Sh./ton	3,178	4,173	5,006	7,083	11,471	11,359	16,813	17,516
Cost to consumers	Mil. Sh.	5,682	7,704	10,292	15,336	25,156	25,490	38,772	44,001
Policy transfers to consumers--									
Price subsidy	Mil. Sh.	-3,143	-4,007	-5,297	-9,967	-17,402	-8,987	-3,510	10,165
Foreign exchange	Mil. Sh.	9,968	10,201	8,288	5,362	4,214	9,811	11,197	2,268
Total policy transfers	Mil. Sh.	6,825	6,193	2,990	-4,604	-13,189	824	7,687	12,433
CSE (per unit value)	Percent	120	80	29	-30	-52	3	20	28
CSE (per unit quantity)	Sh./ton	3,817	3,355	1,454	-2,127	-6,014	367	3,333	4,950
	US$/ton	410	302	95	-122	-184	6	34	35
Rice:									
Level of consumption	1,000 tons	227	274	304	342	407	432	340	352
Wholesale price	Sh./ton	5,128	6,904	12,956	13,927	17,902	30,518	50,518	67,642
Cost to consumers	Mil. Sh.	1,164	1,892	3,939	4,763	7,286	13,184	17,176	23,810
Policy transfers to consumers--									
Price subsidy	Mil. Sh.	-515	-967	-2,751	-3,417	-4,384	-6,490	-6,338	-7,674
Foreign exchange	Mil. Sh.	2,547	2,552	1,970	1,344	1,577	3,980	3,441	676
Total policy transfers	Mil. Sh.	2,032	1,585	-782	-2,073	-2,807	-2,509	-2,897	-6,999
CSE (per unit value)	Percent	175	84	-20	-44	-39	-19	-17	-29
CSE (per unit quantity)	Sh./ton	8,950	5,783	-2,571	-6,060	-6,896	-5,809	-8,521	-19,882
	US$/ton	962	521	-168	-346	-211	-90	-86	-139
Cotton:									
Level of consumption	1,000 tons	13	12	16	13	13	14	12	13
Wholesale price	Sh./ton	15,870	21,400	26,320	43,590	81,350	116,300	175,000	250,000
Cost to consumers	Mil. Sh.	214	251	430	576	1,031	1,599	2,065	3,358
Policy transfers to consumers--									
Price subsidy	Mil. Sh.	-20	-7	68	-280	-471	5	-354	-758
Foreign exchange	Mil. Sh.	761	672	826	296	304	954	543	109
Total policy transfers	Mil. Sh.	741	664	893	16	-166	959	189	-649
CSE (per unit value)	Percent	346	265	208	3	-16	60	9	-19
CSE (per unit quantity)	Sh./ton	54,973	56,719	54,731	1,182	-13,132	69,782	16,014	-48,303
	US$/ton	5,911	5,110	3,577	68	-402	1,085	161	-337

Sh. = Tanzanian shilling.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

The Government is concerned about the decline in world commodity prices, particularly for cotton and coffee, and the implications of this decline for the repayment of funds that were borrowed by cooperative unions to finance a bumper cotton crop in 1991/92. The removal of many of the foreign exchange restrictions should facilitate exports and allow unions to make substantial reductions in their outstanding debt.

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Appendix: Methodology

Producer and consumer subsidy equivalents were estimated for five crops in Tanzania. The level of government intervention was calculated for three food crops, wheat, rice, and corn, and two cash/export crops, coffee and cotton lint.

Pricing Policy

For PSE's, domestic producer prices, including an estimate of marketing costs, were compared with reference prices plus transportation costs. The U.S. gulf prices were used as reference prices for wheat and corn, and the Thai 2nd grade price was used for rice. Tanzania's export unit values were substituted for world reference prices for coffee and cotton lint because of quality differences of Tanzanian commodities as compared with those reflected in the world price.

For CSE's, the retail and reference prices were compared. The price of wheat flour was converted to wheat equivalent. An estimate of marketing costs was subtracted from domestic food crop prices. Where appropriate, the reference prices in U.S. dollars were converted to Tanzanian shillings at the official exchange rate.

Marketing costs (a third of the producer price) for wheat were based on those for corn (7). These costs were added to the producer price and compared with the U.S. gulf price plus ocean freight. Marketing and processing costs of flour were subtracted from the retail price converted to wheat equivalent.

For corn, the producer price was increased by a third to account for marketing costs, and this was compared with the price at U.S. gulf ports (7). The ocean freight rates for wheat were applied to corn (5). At the consumer level, the retail price of corn grain minus 20 percent of the marketing costs was used to arrive at the domestic price that was compared with the reference price.

The into-store cost of domestic rice was used as the estimate of producer price plus marketing costs for 1985-87 (9). Marketing costs for other years were calculated from these data. These prices were compared with the reference price (Thai 100 percent 2nd grade free on board (f.o.b.) Bangkok) plus transportation costs to calculate the price wedge of the PSE. The retail price was reduced by 20 percent of the marketing costs to compute a comparable domestic price used to calculate the price CSE's.

For cotton, the actual marketing costs, which were almost 50 percent of the producer price, of seed cotton for 1982 and 1983 were added to the producer price (7). The percentage was applied to the later years to estimate costs when no data were available. These prices were converted to lint equivalent and compared with Tanzania's cotton export unit values. Because of the wide range of cotton grade trade in world markets, the Liverpool index was not considered a valid reference price.

The export unit value of Tanzania's coffee was similarly used as the reference price. Domestically, the marketing costs were added to the producer price and the two prices compared. No CSE was calculated for coffee, since domestic use is small, with little government intervention.

Exchange Rate Policy

The equilibrium exchange rate was calculated using the index of the real effective exchange rate and multiplying it by the 1990 official exchange rate (2). The Tanzanian shilling has been devalued several times since 1985. The equilibrium rate was assumed to equal the official rate in 1990. The difference between the equilibrium rate and the official rate represents the distortion cause by exchange rate policy. This difference was multiplied by the volume of production (or consumption) and by the product price to determine exchange rate transfers.

Fertilizer Policy

Fertilizer prices are set by the Government in Tanzania. The policy provided subsidies to producers in most years. To calculate the value of this subsidy, the domestic price of urea was compared with the world price converted to shillings (9, 3). The difference in the prices was multiplied by the share of total fertilizer applied to each crop as reported in the Annual Agricultural Situation Reports (9).

Appendix table 1—Wheat: Calculation of Tanzania's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	65	60	59	52	60	54	53	50
B. Production	1,000 tons	58	74	83	72	72	75	76	97
C. Producer price	Sh./ton	2,500	3,000	4,500	6,000	7,200	9,000	10,350	13,000
D. Producer value (B*C)/1,000	Mil. Sh.	145	222	374	432	518	675	787	1,261
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including marketing costs	Sh./ton	3,731	4,478	6,716	8,955	10,746	13,433	15,448	19,403
b. Border price, U.S. gulf port plus transportation	US$/ton	186	190	187	174	145	139	198	200
c. Border price, U.S. gulf port plus transportation	Sh./ton	1,730	2,109	2,858	3,047	4,742	8,965	19,630	28,679
d. Price support (1a-1c)*B/1,000	Mil. Sh.	116	175	320	425	432	335	-318	-900
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	8,524	7,929	7,600	6,089	7,318	14,296	25,863	29,880
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. Sh.	-394	-431	-394	-219	-186	-400	-474	-116
3. Fertilizer --									
a. Urea, any origin (Europe)	Sh./ton	7,310	5,194	6,969	4,769	5,400	12,009	20,279	20,443
b. Tanzania fertilizer price, urea 46%	Sh./ton	3,115	3,115	6,975	6,975	7,640	9,932	15,209	14,310
c. Fertilizer use	1,000 tons	82	90	99	118	130	139	123	180
d. Fertilizer subsidy ((3a-3b)*3c/1,000) *0.022 (2.2 percent of total use)	Mil. Sh.	8	4	-0	-6	-6	6	14	24
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. Sh.	-270	-251	-73	201	240	-58	-778	-992
2. Producer subsidy equivalents (F1/D)*100	Percent	-186	-113	-20	46	46	-9	-99	-79
G. Consumption	1,000 tons	118	125	142	133	132	135	120	127
H. Reil price, flour	Sh./ton	3,822	5,464	9,997	11,793	17,399	24,313	47,940	65,679
I. Consumer cost (G*H)/1,000	Mil. Sh.	451	683	1,420	1,568	2,297	3,282	5,753	8,341
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, U.S. gulf port plus transportation	Sh./ton	1,730	2,109	2,858	3,047	4,742	8,965	19,630	28,679
b. Retail price, flour	Sh./ton	3,822	5,464	9,997	11,793	17,399	24,313	47,940	65,679
c. Price support (1a-1b)*G/1,000	Mil. Sh.	-247	-419	-1,014	-1,163	-1,671	-2,072	-3,397	-4,699
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	8,524	7,929	7,600	6,089	7,318	14,296	25,863	29,880
d. Exchange rate subsidy (2c-1a)*G/1,000	Mil. Sh.	802	727	673	405	340	720	748	153
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Sh.	555	308	-340	-759	-1,331	-1,352	-2,649	-4,547
2. Consumer subsidy equivalents (K1/I)*100	Percent	123	45	-24	-48	-58	-41	-46	-55

ha. = Hectare.
Sh. = Tanzanian shilling.
US$ = U.S. dollar.

Appendix table 2—Corn: Calculation of Tanzania's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1.000 ha.	1.350	1.350	1.609	1.629	1.649	1.672	1.725	1.777
B. Production	1.000 tons	1.654	1.651	1.939	2.093	2.210	2.359	2.339	3.126
C. Producer price	Sh./ton	1.750	2.200	4.000	5.226	6.223	8.077	9.000	11.000
D. Producer value (B*C)/1.000	Mil. Sh.	2.895	3.632	7.756	10.938	13.753	19.054	21.051	34.386
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including marketing costs	Sh./ton	2.612	3.284	5.970	7.809	9.867	12.282	13.433	16.418
b. Border price, U.S. f.o.b. plus transportation	US$/ton	153	180	159	142	108	114	154	150
c. Border price, U.S. f.o.b. plus transportation	Sh./ton	1.420	2.003	2.429	2.480	3.536	7.354	15.291	21.563
d. Price support (1a-1c)*B/1.000	Mil. Sh.	1.972	2.115	6.865	11.154	13.992	11.625	-4.347	-16.084
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	6.995	7.528	6.460	4.957	5.457	11.726	20.147	22.466
d. Exchange rate subsidy (1c-2c)*B/1.000	Mil. Sh.	-9.221	-9.123	-7.816	-5.184	-4.246	-10.314	-11.357	-2.823
3. Fertilizer--									
a. Urea, any origin (Europe)	Sh./ton	7.310	5.194	6.969	4.769	5.400	12.009	20.279	20.443
b. Tanzania fertilizer price, urea 46%	Sh./ton	3.115	3.115	6.975	6.975	7.640	9.932	15.209	14.310
c. Fertilizer use	1.000 tons	82	90	99	118	130	139	123	180
d. Fertilizer subsidy ((3a-3b)*3c/1.000) *0.053(53 percent of total use)	Mil. Sh.	183	99	-0	-138	-154	153	330	585
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. Sh.	-7.066	-6.909	-951	5.832	9.591	1.464	-15.374	-18.321
2. Producer subsidy equivalents (F1/D)*100	Percent	-244	-190	-12	53	70	8	-73	-53
G. Consumption	1.000 tons	1.788	1.846	2.056	2.165	2.193	2.244	2.306	2.512
H. Retail price, corn grain	Sh./ton	3.178	4.173	5.006	7.083	11.471	11.359	16.813	17.516
I. Consumer cost (G*H)/1.000	Mil. Sh.	5.682	7.704	10.292	15.336	25.156	25.490	38.772	44.001
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, U.S. gulf f.o.b. plus transportation	Sh./ton	1.420	2.003	2.429	2.480	3.536	7.354	15.291	21.563
b. Retail price, corn grain	Sh./ton	3.178	4.173	5.006	7.083	11.471	11.359	16.813	17.516
c. Price support (1a-1b)*G/1.000	Mil. Sh.	-3.143	-4.007	-5.297	-9.967	-17.402	-8.987	-3.510	10.165
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	6.995	7.528	6.460	4.957	5.457	11.726	20.147	22.466
d. Exchange rate subsidy (2c-1a)*G/1.000	Mil. Sh.	9.968	10.201	8.288	5.362	4.214	9.811	11.197	2.268
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Sh.	6.825	6.193	2.990	-4.604	-13.189	824	7.687	12.433
2. Consumer subsidy equivalents (K1/I)*100	Percent	120	80	29	-30	-52	3	20	28

ha. — Hectare.
Sh. — Tanzanian shilling.
f.o.b. — Free on board.
US$ — U.S. dollar.

Appendix table 3—Rice: Calculation of Tanzania's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	297	304	312	323	333	409	421	434
B. Production, paddy	1,000 tons	320	350	356	427	547	644	615	570
C. Producer price, paddy	Sh./ton	3,000	4,000	6,000	7,828	9,254	14,400	17,300	19,000
D. Producer value (B*C)/1,000	Mil. Sh.	960	1,400	2,136	3,343	5,062	9,274	10,640	10,830
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price, milled including marketing costs	Sh./ton	6,134	8,178	12,267	15,958	22,004	32,549	39,123	42,967
b. Border price, Thai 2nd grade plus transportation	US$/ton	307	304	255	225	218	241	321	320
c. Border price, Thai 2nd grade plus transportation	Sh./ton	2,858	3,375	3,905	3,936	7,131	15,496	31,875	45,841
d. Price support (1a-1c)*B/1,000	Mil. Sh.	1,048	1,681	2,977	5,133	8,136	10,982	4,457	-1,638
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	14,078	12,687	10,385	7,867	11,006	24,709	41,997	47,760
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. Sh.	-3,591	-3,259	-2,307	-1,679	-2,120	-5,933	-6,225	-1,094
3. Fertilizer--									
a. Urea, any origin (Europe)	Sh./ton	7,310	5,194	6,969	4,769	5,400	12,009	20,279	20,443
b. Tanzania fertilizer price, urea 46%	Sh./ton	3,115	3,115	6,975	6,975	7,640	9,932	15,209	14,310
c. Fertilizer use	1,000 tons	82	90	99	118	130	139	123	180
d. Fertilizer subsidy ((3a-3b)*3c/1,000) *0.039 (3.9 percent of total use)	Mil. Sh.	13	7	0	-10	-11	11	24	43
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. Sh.	-2,529	-1,571	670	3,445	6,005	5,060	-1,743	-2,689
2. Producer subsidy equivalents (F1/D)*100	Percent	-263	-112	31	103	119	55	-16	-25
G. Consumption	1,000 tons	227	274	304	342	407	432	340	352
H. Retail price	Sh./ton	5,128	6,904	12,956	13,927	17,902	30,518	50,518	67,642
I. Consumer cost (G*H)/1,000	Mil. Sh.	1,164	1,892	3,939	4,763	7,286	13,184	17,176	23,810
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, Thai 2nd grade plus transportation	Sh./ton	2,858	3,375	3,905	3,936	7,131	15,496	31,875	45,841
b. Retail price	Sh./ton	5,128	6,904	12,956	13,927	17,902	30,518	50,518	67,642
c. Price support (1a-1b)*G/1,000	Mil. Sh.	-515	-967	-2,751	-3,417	-4,384	-6,490	-6,338	-7,674
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	14,078	12,687	10,385	7,867	11,006	24,709	41,997	47,760
d. Exchange rate subsidy (2c-1a)*G/1,000	Mil. Sh.	2,547	2,552	1,970	1,344	1,577	3,980	3,441	676
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Sh.	2,032	1,585	-782	-2,073	-2,807	-2,509	-2,897	-6,999
2. Consumer subsidy equivalents (K1/I)*100	Percent	175	84	-20	-44	-39	-19	-17	-29

ha. — Hectare.
Sh. — Tanzanian shilling.
US$ — U.S. dollar.

Appendix table 4--Cotton lint: Calculation of Tanzania's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1.000 ha.	360	375	340	335	450	460	430	260
B. Production, lint	1.000 tons	43	48	51	42	71	81	63	36
C. Producer price, lint	Sh./ton	13.373	17.463	25.075	38.806	50.448	58.060	66.716	83.582
D. Producer value (B*C)/1.000	Mil. Sh.	574	834	1.279	1.643	3.598	4.729	4.226	3.026
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price, lint including marketing cost	Sh./ton	28.179	35.731	52.239	80.846	105.100	120.958	138.993	174.129
b. Border price, export unit value	US$/ton	1.546	1.872	1.992	1.280	1.352	1.815	1.540	1.842
c. Border price, export unit value	Sh./ton	14.380	20.780	30.480	22.400	44.200	116.700	144.978	193.590
d. Price support (1a-1c)*B/1.000	Mil. Sh.	592	714	1.110	2.475	4.343	347	-379	-704
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Percent overvaluation	Percent	393	276	166	100	54	59	32	4
d. Border price, equilibrium exchange rate	Sh./ton	70.843	78.119	81.051	44.772	68.218	186.082	191.014	201.697
e. Exchange rate subsidy (1c-2d)*B/1.000	Mil. Sh.	-2.422	-2.737	-2.579	-947	-1.713	-5.651	-2.916	-293
3. Fertilizer --									
a. Urea, any origin (Europe)	Sh./ton	7.310	5.194	6.969	4.769	5.400	12.009	20.279	20.443
b. Tanzania fertilizer price, urea 46%	Sh./ton	3.115	3.115	6.975	6.975	7.640	9.932	15.209	14.310
c. Fertilizer use	1.000 tons	82	90	99	118	130	139	123	180
d. Fertilizer subsidy ((3a-3b) *3c/1.000)*0.01 (10 percent of total use)	Mil. Sh.	35	19	-0	-26	-29	29	62	110
F. Total transfers to producers:									
1. Total (1d+2e+3d)	Mil. Sh.	-1.796	-2.005	-1.469	1.501	2.601	-5.275	-3.233	-888
2. Producer subsidy equivalents (F1/D)*100	Percent	-313	-240	-115	91	72	-112	-77	-29
G. Consumption	1.000 tons	13	12	16	13	13	14	12	13
H. Wholesale price	Sh./ton	15.870	21.400	26.320	43.590	81.350	116.300	175.000	250.000
I. Consumer cost (G*H)/1.000	Mil. Sh.	214	251	430	576	1.031	1.599	2.065	3.358
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, export unit value	Sh./ton	14.380	20.780	30.480	22.400	44.200	116.700	144.978	193.590
b. Wholesale price	Sh./ton	15.870	21.400	26.320	43.590	81.350	116.300	175.000	250.000
c. Price support (1a-1b)*G/1.000	Mil. Sh.	-20	-7	68	-280	-471	5	-354	-758
2. Exchange rate adjustment--									
a. Official exchange rate	Sh./US$	9	11	15	18	33	64	99	143
b. Equilibrium exchange rate	Sh./US$	46	42	41	35	50	103	131	149
c. Border price, equilibrium exchange rate	Sh./ton	70.843	78.119	81.051	44.772	68.218	186.082	191.014	201.697
d. Exchange rate subsidy (2c-1a)*G/1.000	Mil. Sh.	761	672	826	296	304	954	543	109
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Sh.	741	664	893	16	-166	959	189	-649
2. Consumer subsidy equivalents (K1/I)*100	Percent	346	265	208	3	-16	60	9	-19

ha. = Hectare.
Sh. = Tanzanian shilling.
US$ = U.S. dollar.

Zambia

By Linda Scott

Economic and Agricultural Developments

For most of its 29-year history, Zambia's economy has been heavily dependent on the copper industry. In the early years of independence, Zambia relied heavily on copper revenues to finance its ambitious social and economic development programs and its import-dependent industrial and agricultural sectors. Although the country has significant agricultural potential, government agricultural policies were designed primarily to ensure a reliable supply of corn, the country's main staple, for the growing urban areas surrounding the copper mines. Zambia is now the most urbanized country in Africa, with over 50 percent of its population residing in urban areas.

When world copper prices collapsed in 1975, the economy entered a period of rapid decline, from which it is still trying to recover. The 1980's were largely characterized by runaway inflation, unmanageable government budget deficits, an inefficient agricultural sector, and a per capita external debt burden that is the highest in the world. Real gross domestic product (GDP) declined every year between 1980 and 1984, with a small increase of less than 2 percent in 1985 and 1986. In 1988, GDP grew a little over 6 percent in real terms in 1 year, primarily as a result of favorable weather, a record corn harvest, strong manufacturing growth, export expansion, and higher copper prices (5).[1]

Large government budget deficits, caused primarily by the maintenance of extensive subsidies despite declining export revenues, limited growth throughout the decade and fueled inflation. Inflation climbed steadily into the double digits throughout the 1980's, reaching 158 percent in 1989. Growth in the money supply also fueled inflation. Between 1985 and 1989, the money supply increased at an average annual rate of 43 percent. Between 1985 and 1988, the growth rate accelerated, increasing from 24 percent in 1985 to averages of 54 and 62 percent in 1987 and 1988. Negative real interest rates brought investment to a virtual standstill (5).

Although more than half the population resides in urban areas, about 60 percent of Zambia's population is directly dependent on agriculture for its income (27). The country has an estimated 60 million hectares of arable land, 25 million of which are suitable for agricultural production. Zambia also has good potential for irrigation, although less than 10 percent of the land is currently irrigated (27). Since independence, however, much of this agricultural capacity has gone untapped in favor of urban poli-

cies designed to support the copper sector. Agriculture's share of GDP remained fixed at 14 percent in the 1980's, and food self-sufficiency eroded. The nation is now a net food importer.

Zambian agriculture is dominated by corn production, which accounts for 70 percent of all land under cultivation and more than 80 percent of total fertilizer consumption. Wheat became increasingly important during the decade, with production growing from 4,000 metric tons in 1980 to 47,000 metric tons in 1989. Wheat is grown under irrigation, primarily by commercial producers, while corn is rainfed and produced mainly by smallholders. Corn production is highly susceptible to weather variations. Four times during the 1980's, the corn crop was significantly reduced by drought or excessive rains. Poor rainfall in 1980, 1983, and 1984 was a major cause of increased imports in those years.

Zambia was self-sufficient in corn through much of the 1960's and 1970's, with imports accounting for less than 3 percent of total consumption between 1965 and 1979. The 1980's, however, were marked by a steady erosion of self-sufficiency, with imports peaking at 24 percent of total consumption during the drought of 1983. Wheat imports as a percentage of total consumption declined in the 1980's, as the Government encouraged domestic growers and limited imports to conserve foreign exchange. In recent years, a significant portion of wheat was obtained as food aid, as commercial import capacity diminished.

Agricultural growth in the 1980's was limited by several interacting factors, including low rural population densities, inefficient marketing systems, late payments to producers that delayed planting and input purchases, poor transportation and storage facilities, and late price announcements. High inflation, which resulted in declining real producer prices, and an overvalued exchange rate that discouraged exports resulted in extensive cross-border smuggling, black markets, and domestic shortages. In 1991/92, an estimated 180,000 tons of corn, or nearly 15 percent of the total crop, was lost through illegal exports, mainly to Zaire, Malawi, and Tanzania (24). Agricultural exports averaged less than 3 percent of total exports between 1982 and 1989.

Policies in the 1980's

Government policies and reform programs in the 1980's stemmed from the desire of the Government and of the international donor community to arrest Zambia's agricultural decline. An inability to meet external debt obligations led to a series of structural adjustment programs undertaken in conjunction with the IMF and World Bank. Economic and agri-

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

cultural policies ranged from extensive government intervention in the early part of the 1980's to liberalization in the latter half of the decade. These polices had a significant effect on the agricultural sector. This report examines the history of government economic policies and intervention in the agricultural sector during the 1980's and attempts to quantify the effect of these policies on the corn and wheat sectors.

Macroeconomic and Trade Policy Developments

Macroeconomic and trade policy in the 1980's ranged from extensive government controls in the early part of the decade to increased liberalization in the latter half. Between 1964 and 1983, the Government pursued a policy of control over most segments of the economy, including interest and exchange rates and producer and consumer prices. As the collapse of the copper industry led to a scarcity of foreign exchange, the Government reacted with an extensive system of foreign exchange restrictions, export taxes, and import licensing. Consumption was financed through deficit spending and external borrowing. When the Government was unable to meet its external debt obligations in 1982, it undertook a series of policy reforms in conjunction with the International Monetary Fund (IMF) and the World Bank, designed to stabilize the economy. Between 1982 and 1985, a set of moderate policy reforms were enacted, including a 35-percent devaluation of the kwacha, interest rate adjustments, reductions in government spending, tax increases, and a doubling of producer corn and fertilizer prices.

In 1985, the Government began a more extensive series of policy reforms, including decontrol of interest rates, huge retail price increases on the heavily subsidized staple food, corn meal, and a foreign exchange auction designed to ease the country's chronic foreign exchange deficit. These measures were ineffective, however, in correcting the economy's long-term structural imbalances. Between October 1985 and the end of 1987, the foreign exchange auction led to a rapid and significant depreciation of the kwacha (K) from K2.15/$U.S. to K12.00/ $U.S. Although the auction had the positive effect of making exports more competitive and of sharply reducing black markets, in the short term, it had an overall negative economic effect. The auction increased the domestic price of imports, and thereby contributed to higher inflation and expanded government budget deficits (1).

The auction, along with the entire reform program, was suspended in 1987 largely because of domestic political pressure stemming from consumer price increases. The 1987-88 period was characterized by the reimposition of controls over the economy, including fixed interest and exchange rates, renewed price controls, and a limit on debt service to no more than 10 percent of export revenues. Late in 1988, mounting inflation, unmanageable budget deficits, and a severe shortage of consumer goods that was caused by smuggling and foreign exchange shortages prompted the Government to enact a new series of policy reforms. These included a 25-percent devaluation of the kwacha, increased interest rates and reserve requirements, and a threefold increase in consumer corn meal prices. A coupon system was introduced to insulate low-income consumers from the full effect of the price increases.

In 1989, the Government undertook a more radical adjustment program known as the Fourth National Development Plan (FNDP). Under this program, producer and consumer price controls were lifted for all commodities with the exception of corn and fertilizer. Price controls were replaced with a system of floor and ceiling prices. The kwacha was further depreciated along with the establishment of a dual-window exchange rate system. Maximum tariff rates were reduced from 100 percent to 50 percent for most goods, with the exception of a few luxury items. The extensive system of foreign exchange licensing and allocation was abolished in 1990. Export controls were also significantly reduced (24).

Implementation of the 1989 program met with limited success. Despite these reforms, many important economic indicators fell far below original expectations. The budget deficit was reduced by only a third of its target, and inflation, which had reached 158 percent in 1989, fell to only 105 percent in 1990. Increased consumer prices for corn meal were rescinded following the outbreak of urban rioting in 1990. Government subsidy payments skyrocketed when consumer prices for corn remained steady despite a threefold increase in producer prices. In 1991, political pressure generated by the upcoming general election inhibited the implementation of further reforms (5).

Reforms moved quickly at the end of 1991 under the administration of newly elected president Frederick Chiluba and his Movement for Multi-party Democracy party. The primary objective of the Government's current reform program is to stabilize the macroeconomic environment in anticipation of a continuing decline in the copper sector. Urgent goals include raising per capita income, export diversification, controlling inflation, and reducing the economy's dependence on imported inputs (5).

Agricultural Policy Developments

Since independence, Zambia's agricultural policies have been designed primarily to provide a cheap and reliable food supply for the country's large and politically powerful urban population. Corn has been the primary focus of the Government's agricultural policies, although intervention in the wheat market has also been widespread. Zambia has tried to meet its agricultural policy objectives through a combination of producer price controls, marketing and input subsidies, and the establishment of a single marketing authority to oversee all stages of corn purchasing, sale, and input distribution.

Pricing Policies

Between 1964 and 1982, the Government tightly controlled most producer and consumer prices. Producer and into-mill prices were set by the Government to maintain low retail prices in urban markets. The Government set producer prices based on several criteria, including production costs, fair return to producers, import-export parity, food security, and political acceptability. The Government also set producer prices for wheat until 1989, when controls were replaced with minimum floor prices.

Price controls on corn were lifted and reimposed several times during the decade. Between 1971 and 1982, the Gov-

ernment pursued a strategy of food self-sufficiency by encouraging corn production in remote areas through a uniform pricing system and by tightly controlling prices in urban retail markets. Under uniform pricing, corn producers nationwide were paid the same price for their crop without regard to distance from market or transportation costs. The Government's agricultural parastatal, the National Agricultural Marketing Board (NAMBOARD), and later, the local Provincial Cooperative Unions (PCU's) were compensated for transportation and marketing costs with government subsidies.

The uniform pricing policy was initially intended to stimulate production by small farmers in remote areas who had been neglected during the colonial period. Instead, the policy encouraged corn production in high-cost regions far from consumer markets, although many of these areas were poorly suited to corn production. Increased production by growers in remote regions significantly increased the cost of transportation and marketing subsidies and presented a considerable drain on government budgets. In the early 1980's, corn subsidies averaged about 5-10 percent of the government budget. By 1989, subsidies accounted for 16 percent of total government expenditures (24).

Producer prices rarely covered production costs, despite government attempts to set producer prices in accordance with estimated production costs and despite the provision of substantial input subsidies, primarily for fertilizer. Rapid inflation, combined with fixed producer prices, significantly eroded rural-urban terms of trade over the decade. Although nominal producer prices for corn increased significantly over the decade, growing by more than 700 percent between 1982 and 1989, real producer prices declined almost steadily. Between 1982 and 1989, producer prices declined at an annual average rate of 4.4 percent. Between 1986 and 1989, real prices dropped 48 percent (18).

Price controls and government subsidies have been the prime target of government reform programs since 1982, although changes have proved to be politically problematic. Most agricultural prices, with the exception of corn, wheat, and fertilizer, were decontrolled in 1982 as part of the Government's first structural adjustment reforms. In 1986, the Government lifted controls for breakfast meal (highly refined corn meal), while retaining fixed prices for roller meal (less refined corn meal). Following urban rioting, prices for both commodities were set and remained unchanged until 1990, when they were increased with the implementation of the FNDP. Again, however, urban rioting and the political pressure of the 1991 elections prompted the Government to rescind the price increase.

Changes in government pricing policies have been the cornerstone of the Chiluba government's reform efforts. Late in 1991, roller meal subsidies were reduced by 50 percent, and breakfast meal subsidies were cut by 90 percent, resulting in a total price increase of more than 100 percent. The Government has now eliminated all subsidies on breakfast meal and has significantly reduced the subsidy on roller meal. The Government also terminated the coupon program for low-income consumers at the end of 1991. These reforms are intended to significantly reduce government subsidy payments in relation to GDP. Current plans are to eliminate all subsidies by

1994 (5). However, it is as yet unclear how the implementation of these policies will be affected by the devastating drought that sharply reduced the 1992 corn harvest.

Marketing Policies

Until very recently, the Government tightly controlled all aspects of agricultural marketing. Between 1964 and 1980, NAMBOARD was solely responsible for the procurement, marketing, international trade, and storage of corn and also for the importation and distribution of inputs. Primary responsibility for corn marketing shifted among agencies several times between 1980 and 1989.

Many of NAMBOARD's responsibilities, including the intraprovincial marketing of crops and inputs, were shifted to the Provincial Cooperative Unions (PCU's) in 1980. After 1980, NAMBOARD's duties were limited to the interprovincial trade of corn and fertilizer, management of the nation's corn stocks, and the import and export of both corn and fertilizers. NAMBOARD was briefly given control again of the sale and distribution of fertilizer in 1985. In 1986, corn marketing was opened to PCU's and private traders, with NAMBOARD set as the buyer of last resort. In 1989, NAMBOARD was abolished under the FNDP. Although markets have now been opened to private traders, the purchase, handling, storage, and transport of corn is still handled primarily by the PCU's.

Throughout the 1980's, government agricultural policies were implemented primarily through payments to NAMBOARD and the PCU's. The uniform pricing system necessitated that the Government compensate marketing agencies for transporting crops from remote regions and for the difference between the into-mill price and marketing costs. The Government also subsidized storage costs for the country's strategic corn reserve. In 1990, the uniform pricing system was replaced with a system of regionally differentiated floor prices in which farmers have the option to sell directly to consumers, millers, cooperatives, and private traders.

Despite attempts at liberalization, the marketing agencies have been beset by logistical inefficiencies, including inadequate storage facilities, late procurement of empty grain bags, and transportation difficulties. Corn production was discouraged by delayed and inadequate government payments. Marketing costs for the corn sector have typically equaled twice the cost of crop production (18).

The Government relies heavily on marketed output to feed the country's large urban population. Recent disruptions in the marketing system have threatened urban food availability. In 1990, the financial difficulties of many of the Cooperative Unions resulted in high onfarm retention rates and a sharp reduction in urban food supplies (24).

The Chiluba government has moved rapidly to reform the marketing system. In March 1992, the Government eliminated fertilizer and corn-handling subsidies and significantly adjusted producer and into-mill prices for the 1992/93 crop year. Millers will be allowed to adjust into-mill prices in response to market conditions (5).

Input Policies

Government fertilizer subsidies have been a central component of Zambia's postindependence agricultural policy. The corn sector accounts for approximately 80 percent of fertilizer consumption. Wheat growers account for about 15 percent of use, with the remainder distributed among other, mainly commercial, crops. In any given year, approximately 75 percent of Zambia's fertilizer imports come from foreign donors, with 25 percent imported commercially (18).

Between 1971 and 1991, fertilizer prices were fixed by the Government. The prices were based on several criteria, including national requirements, the anticipated mix of donor pledges, commercial imports, domestic production, the average cost per ton of local and imported fertilizers, and anticipated subsidy levels. Beginning in 1971, fertilizer was priced uniformly throughout the country and was imported and distributed by NAMBOARD. Differentials in transportation and marketing costs were paid for with government subsidies. Prices were fixed between 1985 and 1987, with a sharp increase in 1988 due to devaluation and a worldwide increase in fertilizer prices. Prices were again increased in 1989 in conjunction with the FNDP.

Fertilizer subsidies have been a major drain on government budgets and have encouraged the production of high-input crops and crop varieties. Fertilizer use has declined somewhat in recent years because of inefficient allocation and late deliveries. Also, Zambia loses an estimated 15,000 to 25,000 tons of fertilizer annually in illegal exports, primarily to Malawi, where local prices have frequently been double those in Zambia. Government subsidies have generally not adequately compensated marketing agencies. Actual costs of fertilizer are estimated to be 50 percent higher than government payments (18).

Consumption Policies

The bulk of the Government's agricultural policies since independence has been designed to provide an inexpensive and reliable source of food for the nation's consumers. Government policies have favored consumers over producers, with consumers insulated from producer and international price increases. The price of corn was set by the Government from 1964 to late 1991, when most remaining corn subsidies were removed by the Chiluba government. Subsidies have been a major cause of government budget deficits and have been a powerful domestic political issue.

Estimation of Policy Intervention in Agriculture

Producer and consumer subsidy equivalents (PSE's and CSE's) were generated for this report to quantify the extent of government intervention in the agricultural sector during 1982-89. Positive PSE's (CSE's) indicate a subsidy for producers (consumers), while negative PSE's (CSE's) indicate a tax. PSE's and CSE's were calculated for the corn and wheat

sectors, two major areas of government intervention during the 1980's. Corn is the primary food crop and main staple in the diet. It accounts for more than 70 percent of total calories and nearly three-quarters of the country's crop area. Corn is primarily rainfed, with most of the marketed output accounted for by small-scale producers. Output is highly susceptible to weather variations. Wheat has increased in importance over the last 10 years, with production increasing at an annual average rate of 26 percent between 1982 and 1989. Production was negligible before 1980. Wheat is grown primarily under irrigation by large-scale commercial producers. Import substitution has been a major government objective for the wheat sector.

Three forms of government intervention were measured: input policies (intervention in the fertilizer market), pricing policies (government price controls and transportation and marketing policies), and foreign exchange policies (exchange rate adjustments). Several policies that affect the agricultural sector were not measured because of data and methodological limitations. These policies include credit policies, research and extension services, agricultural investment, and government monetary and fiscal policies.

Results for Producers

The PSE's indicate that corn producers were taxed, while wheat producers were, for the most part, subsidized (table 1). The level of taxation on corn producers increased over the decade, while subsidies for wheat producers remained fairly steady, with the exception of 1989, when wheat producers were taxed. Government pricing policies had by far the most significant effect on producers, particularly in the corn sector. Government-set prices remained far below import parity in the corn sector over most of the period of this study, with the exception of 1982. Fertilizer subsidies were an important source of support for wheat producers.

Results by Commodity

Corn PSE's were large and negative throughout the decade, indicating a net tax on producers (fig. 1) (table 2). This factor primarily resulted from government agricultural policies, which maintained low retail prices in urban areas through reduced producer prices. An exception occurred in 1982, when producers were subsidized at a level of 3 percent because of a combination of low world prices and an overvalued exchange rate. Taxes on corn producers increased steadily between 1983 and 1987 from 58 to 122 percent but then dropped somewhat in 1989 to 103 percent, when the Government tried to stimulate corn production and reduce consumer subsidies under the FNDP.

The Government attempted to increase support to producers during this period, first through input subsidies, particularly on fertilizer, and second through increases in producer prices, which climbed nearly 700 percent in nominal terms between 1982 and 1989. However, the substantial depreciation of the currency over the course of the decade, which significantly increased import prices, resulted in a net level of taxation. The domestic price of imported corn, including

Table 1--Zambia: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Fertilizer subsidy	Mil. K.	3	-7	0	15	53	87	65	125
Price subsidy	Mil. K.	7	-107	-182	-316	-1,037	-1,138	-1,767	-2,419
Foreign exchange	Mil. K.	-4	5	44	-36	96	-69	-3	-149
Policy transfers:									
Wheat	Mil. K.	2	1	2	1	3	3	20	-15
Corn	Mil. K.	3	-109	-140	-338	-891	-1,123	-1,726	-2,428
PSE by commodity:									
Wheat	Percent	63	18	37	15	10	8	27	-15
Corn	Percent	3	-58	-59	-96	-119	-122	-100	-103
Total policy transfers	Mil. K.	6	-109	-138	-336	-888	-1,120	-1,705	-2,443
Value to producers	Mil. K.	135	195	242	362	777	962	1,801	2,462
Total commodity PSE	Percent	4	-56	-57	-93	-114	-116	-95	-99

K. = Kwacha.
PSE = Producer subsidy equivalent.

transportation costs, grew from K235 per ton in 1982 to K3,338 in 1989, an 8-year increase of more than 1,300 percent. Ironically, producers were taxed most heavily in 1985 and 1986, when producer prices nearly tripled. This resulted mainly from the foreign exchange auction, which caused rapid currency depreciation and widened the gap between producer prices and the domestic cost of imported corn.

Figure 1

Zambia: Corn producer subsidy equivalent

Wheat producers were subsidized throughout the decade. The exception occurred in 1989, when the removal of domestic price controls and devaluation resulted in a net level of taxation. The level of support fluctuated significantly throughout the decade, averaging 25 percent between 1982 and 1988.

The Government sought to encourage domestic wheat production during this period for two reasons. First, policymakers aimed to satisfy a rising demand for wheat in urban areas, while reducing the country's growing import dependency during a period of worsening foreign exchange shortages. Second, the Government hoped to reduce the periodic shortages of flour that occurred during the 1980's as a result of smuggling, reductions in output, and financial constraints that limited imports. Over the decade, domestic production accounted for an increasing share of total consumption, as production increased, and imports were reduced. Toward the end of the decade, food aid accounted for a growing portion of wheat imports, as the ability to commercially import it diminished. Food aid accounted for 100 percent of wheat imports between 1987 and 1989.

Results by Policy

The fertilizer subsidy has been an important mechanism of agricultural intervention in Zambia in both the wheat and corn sectors. The subsidy was begun to compensate producers for low government-set prices. The retail price of fertilizer was subsidized at an average annual rate of 22 percent between 1982 and 1989, with the highest subsidy levels occurring in 1986, 1987, and 1989. Subsidies displayed a steadily increasing trend between 1985 and 1989. Medium- and large-scale commercial producers located close to transportation networks have been the major beneficiaries of the fertilizer subsidy.

For the most part, the fertilizer subsidy, although substantial, was insufficient to compensate corn producers for the negative impact of government pricing and foreign exchange policies. The exception occurred during 1985-87, when the fertilizer subsidy offset pricing policy in the wheat sector and resulted in a net level of producer support.
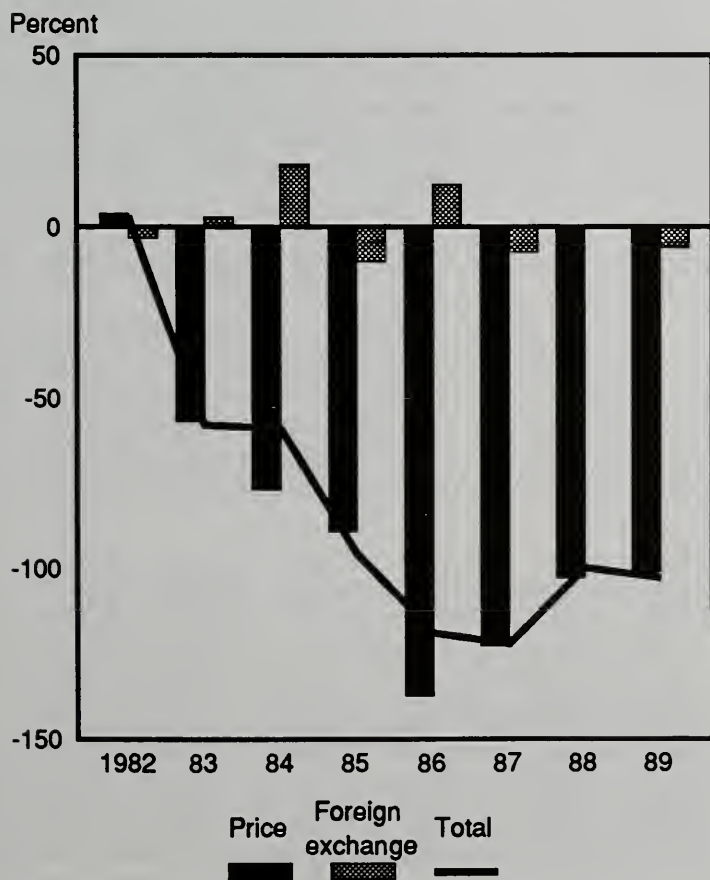
The price component was the most significant of the three policies measured in this study. Government pricing policy in the corn sector resulted in an increasing level of taxation in all years except 1982. Between 1983 and 1989, the level of taxation from the price effect increased at an annual average rate of 79 percent. This level occurred as government budget difficulties worsened and the structural adjustment process caused significant currency devaluation and increased import prices.

The price component for wheat moved from positive to negative several times during the period of the study. However, in all years except 1989 the positive impact of the fertilizer and foreign exchange policies were sufficient to result in an overall level of support. Strong producer prices in 1982 combined with an overvalued exchange rate to keep import prices and transportation costs low and to enable the Government to support producers while at the same time maintaining a controlled retail market. Producers were also supported in 1983 and 1984, even though an undervalued exchange rate increased the domestic price of imports. Despite a near doubling of producer prices during 1985-87, the 125-percent increase in the domestic price of imports, precipitated by rapid currency depreciation during the foreign exchange auction, offset the price effect. The support level declined 7 percent during this period. Wheat producers were taxed for the first time in 1989, as the domestic price of imports increased nearly 60 percent, compared with a 9-percent increase in producer prices.

In both the wheat and corn sectors, the foreign exchange policies taxed producers during years of currency overvaluation and subsidized exporters in years of undervaluation. The taxa-

tion of producers through foreign exchange policies in the latter half of the decade was more extreme among corn producers than among wheat producers. In no case did a positive foreign exchange component offset the substantial effect of pricing policies within the corn sector. In the wheat sector, however, the positive foreign exchange effect, combined with support provided by the fertilizer subsidy, offset the price effect and resulted in a net level of support to producers in 1986.

Results for Consumers

Corn consumers were heavily subsidized throughout the decade, while wheat consumers were taxed (table 3). These policies were consistent with government objectives, which sought to support consumption of the staple, corn, among urban dwellers while discouraging the consumption of wheat, the importation of which presented a drain on the country's scarce foreign exchange reserves. During 1986-89, retail prices for plain flour grew nearly 800 percent after marketing costs were subtracted, compared with a 143-percent increase in the domestic import price. Government pricing policies were significantly more important for consumers than foreign exchange policies. The price effect grew significantly after 1986, as increases in retail corn prices lagged behind the substantial increases in import prices that occurred as a result of currency devaluation. Taxes on wheat consumers and subsidies for corn consumers both increased steadily in subsequent years.

Results by Commodity

Zambia's two main staples, roller and breakfast meal, were both heavily subsidized during the period of this study, with

Table 2--Zambia: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	11	12	10	18	30	33	35	44
Producer price	K./ton	356	397	472	502	960	1,233	2,111	2,300
Value to producers	Mil. K.	4	5	5	9	29	41	74	101
Policy transfers to producers--									
Fertilizer subsidy	Mil. K.	0	-1	0	2	8	14	10	20
Price subsidy	Mil. K.	2	2	1	-0	-9	-8	10	-27
Foreign exchange	Mil. K.	-0	0	1	-1	4	-3	-0	-8
Total policy transfers	Mil. K.	2	1	2	1	3	3	20	-15
PSE (per unit value)	Percent	63	18	37	15	10	8	27	-15
PSE (per unit quantity)	K./ton	224	73	173	76	97	102	579	-334
PSE (per unit quantity)	US$/ton	242	58	96	28	13	11	70	-26
Corn:									
Level of production	1,000 tons	735	935	872	1,122	1,224	1,063	1,943	1,700
Producer price	K./ton	178	203	272	315	611	867	889	1,389
Value to producers	Mil. K.	131	190	237	353	748	921	1,727	2,361
Policy transfers to producers--									
Fertilizer subsidy	Mil. K.	2	-6	0	13	45	73	55	105
Price subsidy	Mil. K.	5	-109	-183	-315	-1,027	-1,130	-1,777	-2,392
Foreign exchange	Mil. K.	-4	5	43	-35	92	-66	-3	-141
Total policy transfers	Mil. K.	3	-109	-140	-338	-891	-1,123	-1,726	-2,428
PSE (per unit value)	Percent	3	-58	-59	-96	-119	-122	-100	-103
PSE (per unit quantity)	K./ton	5	-117	-160	-301	-728	-1,057	-888	-1,428
PSE (per unit quantity)	US$/ton	5	-94	-89	-111	-100	-119	-108	-111

K. = Kwacha.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Table 3--Zambia: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. K.	24	166	228	278	1,319	1,800	1,769	1,761
Foreign exchange	Mil. K.	5	-6	-45	33	-87	74	2	114
Policy transfers by commodity:									
Wheat	Mil. K.	-14	-4	-5	-25	8	-186	-298	-614
Corn	Mil. K.	43	164	189	337	1,224	2,060	2,069	2,489
CSE by commodity:									
Wheat	Percent	-34	-11	-17	-35	9	-58	-64	-70
Corn	Percent	32	89	77	89	306	487	440	159
Total policy transfers	Mil. K.	29	160	183	312	1,232	1,874	1,771	1,875
Cost to consumers	Mil. K.	176	218	276	450	494	741	934	2,439
Total commodity CSE	Percent	16	74	66	69	249	253	190	77

K. = Kwacha.
CSE = Consumer subsidy equivalent.

support increasing steadily throughout the decade (fig. 2) (table 4). Support ranged from 32 percent of consumer costs in 1982 to 487 percent in 1987. Such support occurred despite attempts by the Government and the international donor community to hold down subsidies as part of an overall policy of fiscal restraint. The steady increase in consumer support occurred as consumers were insulated from large increases in producer and import prices. The high level of support was also caused by the Government's reluctance to increase consumer prices for political and social reasons.

In contrast with corn consumers, wheat consumers were taxed throughout the 1980's, while wheat producers were moderately subsidized. The exception to this policy occurred in 1986, when a positive price subsidy offset the negative foreign exchange effect. During this year, consumers were subsidized and were thus partially insulated from the more than twofold increase in import prices.

Results by Policy

Government pricing policy had by far the largest effect on consumer subsidy and taxation levels. Between 1987 and 1989, pricing policy was virtually the sole determinant of taxation levels for wheat consumers. Pricing policy was equally important in the corn sector, where it accounted for the majority of the consumer subsidy throughout the decade.

The foreign exchange effect was minimal for consumers throughout the 1980's. In no case did this effect reverse the direction of subsidies or taxes induced by pricing policies. The foreign exchange effect was most significant in the wheat sector in 1989, when this effect expanded to its largest level of the decade to slightly moderate an otherwise heavy level of taxation. The foreign exchange component was most significant for corn consumers in the same year. In 1989, the substantial foreign exchange effect added significantly to an already record consumer subsidy.

Conclusions

The newly elected Chiluba government faces major challenges in the coming years in reversing Zambia's economic decline. The Government has committed itself to implementing the policy reforms necessary for restoring economic growth, although it still faces major obstacles in the coming

Figure 2

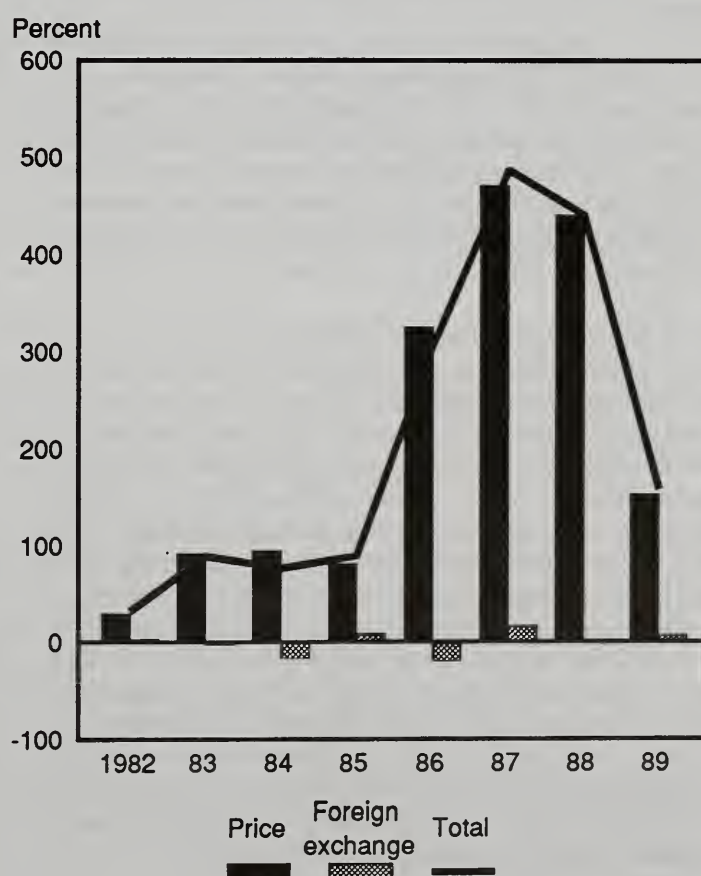### Zambia: Corn consumer subsidy equivalent

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Table 4—Zambia: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	123	98	68	69	76	72	78	74
Retail price	K./ton	345	334	461	1,031	1,238	4,416	5,942	11,832
Cost to consumers	Mil. K.	42	33	31	71	94	318	463	876
Policy transfers to consumers--									
Price subsidy	Mil. K.	-15	-3	-2	-28	18	-192	-298	-626
Foreign exchange	Mil. K.	1	-1	-3	3	-10	6	0	13
Total policy transfers	Mil. K.	-14	-4	-5	-25	8	-186	-298	-614
CSE (per unit value)	Percent	-34	-11	-17	-35	9	-58	-64	-70
CSE (per unit quantity)	K./ton	-117	-37	-80	-365	106	-2,581	-3,821	-8,291
CSE (per unit quantity)	US$/ton	-126	-30	-45	-134	14	-290	-465	-643
Corn:									
Level of consumption	1,000 tons	752	913	846	975	1,030	1,090	1,210	1,214
Into-mill price	K./ton	178	203	289	389	389	389	389	1,288
Cost to consumers	Mil. K.	134	185	244	379	400	423	470	1,563
Policy transfers to consumers--									
Price subsidy	Mil. K.	39	169	230	306	1,301	1,992	2,067	2,388
Foreign exchange	Mil. K.	4	-5	-42	30	-77	68	2	101
Total policy transfers	Mil. K.	43	164	189	337	1,224	2,060	2,069	2,489
CSE (per unit value)	Percent	32	89	77	89	306	487	440	159
CSE (per unit quantity)	K./ton	57	180	223	345	1,188	1,890	1,710	2,050
CSE (per unit quantity)	US$/ton	62	144	124	127	163	213	208	159

K. = Kwacha.
CSE = Consumer subsidy equivalent.
US$ = U.S. dollar.

years. During its short tenure in office, this Government has already made significant progress through the widespread removal of price controls, reductions in government subsidies, and increased privatization of the agricultural marketing system.

The PSE's and CSE's confirm the extent to which the Government has intervened in the agricultural sector over the past decade. Huge consumer subsidies have contributed to growing budget deficits, which have exacerbated Zambia's economic problems. Both the Government and the international community recognize that such expenditures are no longer sustainable, given the country's precarious fiscal situation.

The Government's immediate challenge will be to reduce the country's dependence on the copper sector, which is expected to continue to falter until the end of the century, as depleted reserves are extracted at an increasingly higher cost. Government priorities will focus on controlling inflation, attracting foreign investment, and stabilizing macroecon-omic indicators while maintaining political viability. Such a program will require exploiting the nation's significant agricultural potential, especially that of small-scale commercial producers, through price adjustments and improvements in the rural infrastructure. Protecting the food security of vulnerable segments of the population during the adjustment period will be a particularly difficult aspect of the reform program. In the past, successful implementation of reform programs has been limited by domestic political pressure, external shocks, massive external debt, and frequent weather variations that have reduced agricultural output.

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Appendix: Methodology

Producer and consumer subsidy equivalents (PSE's and CSE's) were estimated for two food crops in Zambia, corn and wheat. The Government intervened heavily in both sectors during the 1980's.

Pricing Policy

PSE's for both sectors were calculated by comparing domestic costs, including marketing costs, with world reference prices, including ocean transportation and land freight charges. The South African price for white corn was used as a reference price for corn, since a large portion of Zambia's corn imports have traditionally come from that country. Accordingly, no ocean freight costs were added to the reference price. Land freight costs were calculated from South Africa, based on 1988 data (24). Inland freight for all remaining years was estimated by adjusting the 1988 figure with the Consumer Price Index. For wheat, the U.S. gulf price was used, with ocean transportation calculated accordingly. Land freight costs were estimated from Dar es Salaam in Tanzania (14).

CSE's were calculated for both corn and wheat by calculating the difference between retail prices in urban markets and the world reference price. For wheat, the retail price of plain flour was converted to wheat equivalents. Marketing costs were then subtracted so that these could be compared with border prices. For corn, the into-mill price was used instead of the retail price, as the into-mill price has been the primary point of government intervention in the marketing chain. Marketing costs for the procurement and storage of roller meal were used as an estimate of marketing costs for both corn and wheat (14).

Exchange Rate Policy

A shadow exchange rate (21) was used to measure the deviation of the official exchange rate from the unofficial or equilibrium rate. The shadow exchange rate is calculated from trade data, derived by measuring a premium on foreign exchange;

that is, the total value of imports and exports in domestic prices divided by the total value of imports and exports in border prices. This premium when multiplied by the official exchange rate measures the degree to which the official rate deviates from equilibrium (21). The undervaluation or overvaluation of the currency for a particular year was measured by calculating the difference between the shadow and the official exchange rates. This difference indicates the degree of distortion induced by government policies in the exchange rate.

Fertilizer Policy

The fertilizer subsidy was calculated by measuring the difference between the world reference price and the domestic price plus marketing costs. For purposes of this analysis, the world and domestic prices for urea were used as a proxy for all fertilizers because of a lack of data for other types. The price gap was then multiplied by total fertilizer use for each commodity, as reported in various studies of the agricultural sector (14, 24). For the corn sector, fertilizer use was estimated at 80 percent of total consumption. For wheat, the figure was 15 percent.

Appendix table 1--Wheat: Calculation of Zambia's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1.000 ha.	4	5	4	5	6	7	9	10
B. Production	1.000 tons	11	12	10	18	30	33	35	44
C. Producer price	K./ton	356	397	472	502	960	1.233	2.111	2.300
D. Producer value (B*C)/1.000	Mil. K.	4	5	5	9	29	41	74	101
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including marketing costs	K./ton	415	466	551	609	1.162	1.519	2.404	2.758
b. Border price, U.S. gulf port plus transportation	US$/ton	237	242	241	229	202	197	258	261
c. Border price, U.S. gulf port plus transportation	K./ton	220	303	432	621	1.472	1.751	2.118	3.368
d. Price support (1a-1c)*B/1.000	Mil. K.	2	2	1	-0	-9	-8	10	-27
2. Exchange rate adjustment--									
a. Official exchange rate	K./US$	1	1	2	3	7	9	8	13
b. Equilibrium exchange rate	K./US$	1	1	2	3	6	9	8	14
c. Border price, equilibrium exchange rate	K./ton	228	297	381	666	1.344	1.835	2.121	3.541
d. Exchange rate subsidy (1c-2c)*B/1.000	Mil. K.	-0	0	1	-1	4	-3	-0	-8
3. Fertilizer --									
a. Urea, any origin (Europe) plus shipping	K./ton	305	337	486	745	1.242	1.810	2.359	3.345
b. Zambia fertilizer price, urea	K./ton	259	482	482	535	535	535	1.300	1.420
c. Fertilizer use	1.000 tons	59	53	44	76	79	72	65	68
d. Fertilizer subsidy ((3a-3b)*3c/1.000)*0.15 (15 percent of total use)	Mil. K.	0	-1	0	2	8	14	10	20
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. K.	2	1	2	1	3	3	20	-15
2. Producer subsidy equivalents (F1/D)*100	Percent	63	18	37	15	10	8	27	-15
G. Consumption	1.000 tons	123	98	68	69	76	72	78	74
H. Retail price, flour	K./ton	345	334	461	1.031	1.238	4.416	5.942	11.832
I. Consumer cost (G*H)/1.000	Mil. K.	42	33	31	71	94	318	463	876
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, U.S. gulf port plus transportation	K./ton	220	303	432	621	1.472	1.751	2.118	3.368
b. Retail price, flour	K./ton	345	334	461	1.031	1.238	4.416	5.942	11.832
c. Price support (1a-1b)*G/1.000	Mil. K.	-15	-3	-2	-28	18	-192	-298	-626
2. Exchange rate adjustment--									
a. Official exchange rate	K./US$	1	1	2	3	7	9	8	13
b. Equilibrium exchange rate	K./US$	1	1	2	3	6	9	8	14
c. Border price, equilibrium exchange rate	K./ton	228	297	381	666	1.344	1.835	2.121	3.541
d. Exchange rate subsidy (2c-1a)*G/1.000	Mil. K.	1	-1	-3	3	-10	6	0	13
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. K.	-14	-4	-5	-25	8	-186	-298	-614
2. Consumer subsidy equivalents (K1/I)*100	Percent	-34	-11	-17	-35	9	-58	-64	-70

ha. — Hectare.
K. — Kwacha.
US$ — U.S. dollar.

Appendix table 2—Corn: Calculation of Zambia's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	456	546	507	582	588	610	723	1,021
B. Production	1,000 tons	735	935	872	1,122	1,224	1,063	1,943	1,700
C. Producer price	K./ton	178	203	272	315	611	867	889	1,389
D. Producer value (B*C)/1,000	Mil. K.	131	190	237	353	748	921	1,727	2,361
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including marketing costs	K./ton	236	272	351	422	813	1,153	1,182	1,847
b. Border price, U.S. f.o.b. plus transportation	US$/ton	247	311	313	259	226	249	255	252
c. Border price, U.S. f.o.b. plus transportation	K./ton	230	389	561	703	1,652	2,216	2,097	3,254
d. Price support (1a-1c)*B/1,000	Mil. K.	5	-109	-183	-315	-1,027	-1,130	-1,777	-2,392
2. Exchange rate adjustment--									
a. Official exchange rate	K./US$	1	1	2	3	7	9	8	13
b. Equilibrium exchange rate	K./US$	1	1	2	3	6	9	8	14
c. Border price, equilibrium exchange rate	K./ton	235	383	512	734	1,577	2,279	2,099	3,338
d. Exchange rate subsidy (1c-2c)*B/1,000	Mil. K.	-4	5	43	-35	92	-66	-3	-141
3. Fertilizer--									
a. Urea, any origin (Europe) plus shipping	K./ton	305	337	486	745	1,242	1,810	2,359	3,345
b. Zambia fertilizer price, urea	K./ton	259	482	482	535	535	535	1,300	1,420
c. Fertilizer use	1,000 tons	59	53	44	76	79	72	65	68
d. Fertilizer subsidy ((3a-3b)*3c/1,000)*0.80 (80 percent of total use)	Mil. K.	2	-6	0	13	45	73	55	105
F. Total transfers to producers:									
1. Total (1d+2d+3d)	Mil. K.	3	-109	-140	-338	-891	-1,123	-1,726	-2,428
2. Producer subsidy equivalents (F1/D)*100	Percent	3	-58	-59	-96	-119	-122	-100	-103
G. Consumption	1,000 tons	752	913	846	975	1,030	1,090	1,210	1,214
H. Into-mill price, corn grain	K./ton	178	203	289	389	389	389	389	1,288
I. Consumer cost (G*H)/1,000	Mil. K.	134	185	244	379	400	423	470	1,563
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, U.S. gulf f.o.b. plus transportation	K./ton	230	389	561	703	1,652	2,216	2,097	3,254
b. Into-mill price, corn grain	K./ton	178	203	289	389	389	389	389	1,288
c. Price support (1a-1b)*G/1,000	Mil. K.	39	169	230	306	1,301	1,992	2,067	2,388
2. Exchange rate adjustment--									
a. Official exchange rate	K./US$	1	1	2	3	7	9	8	13
b. Equilibrium exchange rate	K./US$	1	1	2	3	6	9	8	14
c. Border price, equilibrium exchange rate	K./ton	235	383	512	734	1,577	2,279	2,099	3,338
d. Exchange rate subsidy (2c-1a)*G/1,000	Mil. K.	4	-5	-42	30	-77	68	2	101
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. K.	43	164	189	337	1,224	2,060	2,069	2,489
2. Consumer subsidy equivalents (K1/I)*100	Percent	32	89	77	89	306	487	440	159

ha. — Hectare.
K. — Kwacha.
f.o.b. — Free on board.
US$ — U.S. dollar.

Zimbabwe

By Margaret Missiaen and Shahla Shapouri

Economic and Agricultural Developments

Zimbabwe is a landlocked country of 9 million people, located in southern Africa just north of the Republic of South Africa. Per capita gross domestic product (GDP) was $650 in 1989. Unlike most Sub-Saharan African countries, agriculture is not the dominant economic sector. Agriculture's share of GDP was about 14 percent in 1989, while mining and manufacturing contributed a third of the value. However, in terms of employment and linkages to the rest of the economy, agriculture's role is considerably greater than its share of GDP. About 70 percent of the population lives in rural areas, and agriculture is their main source of income. Zimbabwe has one of the largest, best integrated, and most diversified manufacturing sectors in Sub-Saharan Africa, based on metal products, food processing, textiles, and chemicals.

A brief historical background is helpful in analyzing the role of the Government in Zimbabwe's economy. Zimbabwe's colonial past is unique in that the white settler minority not only was sizable and influential but, after 1923, possessed de facto self-government. The Unilateral Declaration of Independence (UDI) in 1965 was an unsuccessful attempt by the minority to win sovereignty. The control of the instruments of government allowed the settlers to structure the economy to their own advantage by means of a broad state of intervention (14).[1] UDI was followed by the imposition of international economic sanctions and civil war. The trade embargo lasted until an agreement on majority rule was reached in 1979. Zimbabwe became independent on April 18, 1980, with a dual economic structure consisting of a well-developed modern sector dominated by a small white population and a largely African, subsistence-communal sector.

The modern sector, accounting for the greater part of the GDP, includes most of the country's fertile agricultural land and mineral resources and is served by a developed transport and electric power infrastructure. Preindependence economic development efforts were centered almost entirely in this sector. Following independence, the political and economic promises of the new Government led to major policy reforms aimed at "growth with equity." The goals were to provide an adequate return to producers, to maintain low consumer prices, to encourage food self-sufficiency, and to promote exports.

The first 2 years of independence brought unprecedented rates of economic growth to Zimbabwe. This growth was largely a consequence of favorable weather, the end of the war, and the removal of sanctions. During the mid-1980's, however, growth slowed dramatically, largely because of droughts, emigration of skilled workers, lack of investment in productive sectors, and disincentives that hindered private sector activity. Since 1988, GDP growth has increased because of good weather and the Government's renewed attention to economic issues. For the decade as a whole, however, income growth has been disappointing, with real per capita income decreasing at an average annual rate of 1 percent.

Zimbabwe's agricultural performance has been viewed as one of the success stories in Sub-Saharan Africa. The sector, however, is faced with major problems which, if ignored, could adversely affect its performance. One major problem is the skewed land distribution. The commercial farmers (fewer than 5,000 farms) operate on about one-third of the land, while more than 1 million families are in the communal area and control about 40 percent of the land. The commercial farms are located in the areas with the most reliable rainfall and good soils, while communal farms are in the areas with inadequate rainfall and low-quality soils. Similar imbalances exist in the marketing network and the use of improved technology.

The conditions and productivity of the commercial farms are similar to those in well-developed agricultural exporting countries, while those of the communal farms are similar to those of the less developed countries of the region. These latter farms are overcrowded, with limited or no use of improved technology.

After independence, the Government made the commitment to reduce the inequalities of land distribution. The Government implemented a resettlement program that allowed commercial farmers to sell their land to the Government. This policy reduced the number of large commercial farms by about 30 percent and led to a 31-percent reduction in area of such farms. These changes in land use influenced the cropping patterns and the use of factors of production. The large commercial farms have moved from production of food crops, particularly corn, to industrial crops. The communal farms increased their market share of food crops. On the commercial farms, the use of capital and machinery has increasingly replaced labor. These changes resulted from the land resettlement policy and the relative shifts in price and cost of production. The cost of production, particularly labor costs, increased significantly because of the government minimum wage policy. The growth in marketed share

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[1]Italicized numbers in parentheses refer to literature cited in the References section at the end of this chapter.

for the communal producers resulted from increased use of improved technology and increased access to marketing services.

Policies in the 1980's

In 1982, the Government published the Transitional National Development Plan for 1982/83-1983/84, followed in 1986 by the comprehensive Five Year Development Plan (1986-90). These plans provided a macroeconomic framework for economic development. Major policy goals of the plans included reductions in the current account deficit through a restrictive monetary policy, limits on overall credit expansion, and cuts in the fiscal deficit. The Government sought to control inflation by keeping the growth of the money supply consistent with that of GDP. The Central Reserve Bank of Zimbabwe regulates monetary and credit levels through credit allocation both directly, by the establishment of quotas for loans, and indirectly, by regulating foreign exchange allocations and changing the level of interest rates (11).

Macroeconomic and Trade Policy Developments

At independence in 1980, the Government inherited an extensive system of direct controls, covering most areas of economic activity, including the allocation of foreign exchange, wage and price determination, and the labor market. These controls were kept in place and even intensified during the 1980's. Direct controls constitute a key element in Zimbabwe's economic policy.

Government spending on education, health, and defense brought about persistent budget deficits during the postindependence period, constraining the Government's ability to maneuver on the budget. Stringent controls on imports and devaluation of the Zimbabwe dollar produced substantial trade surpluses in recent years. However, large deficits on services led to current account imbalances. The Government is committed to limiting external debt accumulation. The debt service ratio fell from 32 percent in 1987 to 23 percent in 1989.

Economic management in the 1980's took place primarily through foreign exchange restrictions and import licensing measures. As a result, Zimbabwe experienced limited exposure to external imbalances, but the inevitable reduction of investment in fixed capital has hampered the country's growth. The Government has begun redirecting resources in favor of private investment by reducing the borrowing requirements of the public sector, increasing foreign exchange allocations, and partially liberalizing investment by foreign firms (11).

Agricultural Policy Developments

The government incentive policies since independence have provided a stable environment for changes consistent with the Government's equity objectives. The policies, however, were not successful in increasing productivity of the agricultural sector, which declined. Producer prices failed to keep up with inflation, and the prices of uncontrolled commodities increased faster than the government-set prices.

The Government's Agricultural Marketing Authority (AMA) authorizes most intervention through commodity marketing boards except for tobacco, which is traded in the open market. Commodity marketing boards include the Grain Marketing Board (GMB), the Cold Storage Commission (CSC), the Dairy Marketing Board (DMB), and the Cotton Marketing Board (CMB). All the boards operate as monopolies in purchasing, processing, selling, and exporting their commodities.

White corn is the staple food in Zimbabwe. Yellow corn, mostly for feed, accounts for about 15 percent of total output. Since 1965, the Government has sought to conserve foreign exchange and target food security by promoting self-sufficiency in corn. Corn receives the highest priority for policy intervention because of its importance in the diet and its centrality in the use of productive resources (land and labor). Other administered commodities are less important, and their prices are adjusted relative to corn.

Wheat is the second major cereal crop in Zimbabwe. Although wheat is produced on irrigated land and on commercial farms, it is also affected by weather, since a reduction in stored water in one season reduces the wheat area in the following season. Recently, wheat output has moderately risen because of increased wheat prices relative to corn and increased availability of water for irrigation.

Cotton is produced both for domestic consumption and for export. The short-staple variety makes up about half of total output and is used domestically, while the long-staple variety commands a premium on the international market. Government policy is to promote cotton production and exports to generate foreign currency while fostering the development of the communal sector. The production of short-staple cotton increased during the 1980s, primarily in the communal areas. Long-staple cotton is produced by commercial farmers, with about half of the output coming from irrigated land. Harvest mechanization is limited because labor is cheap and plentiful. An increase in labor costs could significantly reduce the profitability of cotton. In 1980, the Government's minimum wage policy was applied for the first time to the agricultural sector. After an initial rapid increase, minimum wages have remained constant in real terms since 1983.

Producer Pricing Policies

Price-setting procedures are a complex mix of analysis of market conditions and of lobbying by the farmer unions. Issues of market conditions include costs of production, size of stock holding, expected domestic demand and supply, financial situation of the marketing boards, and trade conditions. After extensive preparation and discussion, the proposed producer prices are reviewed at the ministerial level, and the final recommendation is approved by the cabinet. The whole process of negotiations takes about 4-5 months, starting in mid-December. The set prices are uniform across the country, thereby encouraging production in remote areas. This pol-

icy has led to increased marketing costs, which put pressure on the government budget. The price policy also fails to take into account the effects that different price levels have on household income. Prices are set for individual crops, and not much attention is paid to the resulting farm earnings.

Nominal corn prices doubled during the 1980's. In real terms, however, high inflation eroded the entire nominal increase. The 1990 real corn price was 30 percent below that of 1980. Until 1988, corn producer prices were based on domestic production costs. The 1985 bumper crop led to substantial increases in GMB costs for crop storage, in addition to the expense of purchasing such a large crop from smallholder farmers. As a result, corn prices were held constant in 1986 and 1987 to reduce both output and stocks and also to diversify production. In 1987, a combination of constant prices and drought reduced the corn crop 56 percent. However, in 1988, prices were raised to stimulate output and increase stocks to offset the effects of the 1987 drought.

Wheat prices are controlled by the Government at all levels through the monopoly on marketing held by the GMB. The GMB incurs losses in most years because of the low margin between its buying and selling prices. These losses are covered by the Government. Since demand for wheat exceeds supply, the GMB rations wheat to the millers through a monthly allocation scheme. The nominal price of wheat increased threefold between 1980 and 1990. However, in real terms, the wheat price declined 20 percent during this period.

Cotton prices reflect the Government's price stabilization policies, protecting producers, especially those in communal areas, from world price variations. Zimbabwe's high-quality cotton finds ready buyers on the world market. The Government, however, restricts exports to supply the local industry with cotton at prices low enough to make its textiles competitive in world markets.

Marketing Policies

Marketing boards play an important role in improving agricultural output, but higher administrative costs and rising budget deficits accompany increases in activity. Since independence, the Government has extended marketing services to small farmers in communal areas, almost doubling the number of collection depots in 10 years. This policy has significantly increased the volume of marketed crops. Marketed corn grew from 46 percent of production in 1980 to 60 percent in 1989. The entire output of wheat is marketed through the marketing board because wheat, produced on commercial farms, is not consumed onfarm. The marketed share of sorghum remains low.

As marketing activities expanded during the 1980's, GMB deficits grew. The Board's deficits resulted from several factors of marketing operations, including commodity storage, handling and transportation, and administrative costs.

Because of the growing burden of marketing board costs, the Government is planning to separate the marketing board functions into commercial services and development serv-

ices. The boards with commercial service responsibilities are expected to maximize their profits in the same degree as does the private sector. Those with development service functions may be subsidized, depending on their performance. The bulk of the GMB activities fall into the development services category. The Government is planning to balance private and public sector marketing activities. The Government is expected to continue its role in managing food security stocks, while the private sector will assume more responsibility for local trade. Formal and informal private marketing is currently constrained by government regulations. Private marketing activities are also hampered by the limited transportation system in rural areas and by credit shortages.

An alternative, and possibly complementary, system would be the expansion of cooperatives. Cooperatives already provide a wide range of services, including input supply and commodity marketing. The number of cooperatives has rapidly increased, currently serving about 40 percent of smallholder farmers. Although cooperatives seem efficient, they suffer from limited resources and inadequate management.

Input Policies

Most fertilizer and seeds are distributed by farm cooperatives and farmers. Improved input use, particularly fertilizer, expanded little during the 1980's. As the number of large-scale commercial farms declined, their use of inputs decreased.

Fertilizer use declined during 1982-84 and again in 1986. Since then, growth rates have been slow, and fertilizer use has not reached the 1985 level. About half of the fertilizer is imported. Commercial farmers use 70-75 percent of fertilizer, which is concentrated on a few crops, 39 percent on corn, 13 percent on wheat, and 10 percent on tobacco. The skewed distribution of use reflects differences in land quality, agroecological potential, drought risk, credit availability, and fertilizer accessibility.

The domestic fertilizer industry, consisting of two production and two retail companies, uses some imported inputs. Fertilizer is mostly distributed by farmers' cooperatives. The Government regulates the distribution system, which suffers from a weak transport infrastructure. Rural areas have no fertilizer storage, and companies halt production when their storage facilities are full. The lack of storage in rural areas and the weak transport system increase distribution costs, especially in communal areas where farmers use small quantities. Fertilizer prices are controlled at the retail level and adjusted periodically by the Government. The price rise of fertilizer in 1985 outpaced the corn price increase and remained high for the rest of the decade.

Compared with other developing countries, particularly those in the region, Zimbabwe shows an impressive record in adoption of new technology. The success is, however, limited to corn and cotton. Corn producers have benefited from the use of hybrid seed, adopted by close to 100 percent of the farmers, an increase from the 29 percent used by communal farmers in 1979. The average corn yields in communal areas

have doubled since independence, and gains are recorded even during drought years. Because of delayed research, new varieties of millet and white sorghum have only recently become available. As a result, the adoption rate for improved varieties of these grains, which are mainly produced by smallholders, has been slow. Improved varieties of white sorghum have increaed yields up to 70 percent, while new millet varieties have increased yields 25 percent. An improved marketing system and improved credit availability for private seed distributors are needed to further enlarge the adoption rates of the improved varieties.

Consumer Policies

The Government also sets consumer prices for major food items. In the years following independence, the Government maintained a cheap food policy, with the retail price of corn meal set below the producer and wholesale prices. As budget deficits increased, the price of meal was allowed to rise much faster than the producer or wholesale prices. The Government has also controlled the rising demand for wheat by rationing supplies to the millers.

Estimation of Policy Intervention in Agriculture

Producer and consumer subsidy equivalents (PSE's and CSE's) were calculated to estimate the magnitude of measurable policies during 1982-89. Positive PSE's (CSE's) indicate that the Government is subsidizing producers (consumers), while negative PSE's (CSE's) indicate a tax. The commodities included for evaluation are representative of the role of government intervention in Zimbabwe's agricultural sector. Tobacco, the most valuable crop, is not included because little government regulation appears in this

sector. The crop is sold at auction for free market prices. Quality differences by type of tobacco make comparisons of international prices difficult. The Government intervenes heavily in the marketing of other crops through the AMA and the various marketing boards. Corn (maize) is the major food crop in Zimbabwe, supplying about 45 percent of the calories in the diet. Some corn is exported, especially to neighboring countries, in years following good harvests. Wheat consumption is becoming more important. The Government has encouraged increased wheat cultivation, but suitable land is limited, since wheat is grown under irrigation during the dry season. Output varies, depending on water accumulation during the previous rainy season. Wheat imports average about a quarter of consumption. Sorghum was included as a nontraded item. Cotton, the second most valuable cash crop, is analyzed because of the strong government role in its promotion. Cotton is increasingly grown by communal farmers and supports an expanding textile industry.

The three principal policies affecting the selected commodities during the period of this study were producer prices (set by the Government), marketing costs (carried by the marketing boards), and exchange rates, which were not agriculture specific but affected trade. Several policies are not included in this study, such as publicly funded extension, research, and investment. The effect of a credit policy is also difficult to measure. Credit is controlled and allocated, but the Government has no direct subsidy policy for interest rates.

Results for Producers

Overall producer tax rates varied widely but showed a declining trend from 80 percent in 1982-84 to 9 percent in 1987-88 (table 1). Exchange rate policy was the dominant form of government intervention in the agricultural sector. Devaluation of the Zimbabwean dollar greatly reduced the differences between producer and border prices during the 1980's.

Table 1--Zimbabwe: Summary of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. Z$	33	-112	-214	-27	175	11	62	17
Foreign exchange	Mil. Z$	-175	-141	-103	-21	-46	-62	-116	-11
Policy transfers by commodity:									
Wheat	Mil. Z$	-11	-10	-6	4	-5	14	1	3
Corn	Mil. Z$	-84	-163	-186	-9	119	-18	57	69
Sorghum	Mil. Z$	-5	-8	-6	-4	2	1	-2	-3
Cotton	Mil. Z$	-42	-72	-120	-39	14	-49	-110	-62
PSE by commodity:									
Wheat	Percent	-27	-38	-24	7	-6	20	1	3
Corn	Percent	-39	-154	-98	-2	26	-9	13	17
Sorghum	Percent	-64	-130	-78	-16	7	14	-5	-19
Cotton	Percent	-54	-86	-85	-20	8	-27	-42	-26
Total policy transfers	Mil. Z$	-142	-253	-318	-47	129	-51	-54	7
Value to producers	Mil. Z$	340	223	362	806	735	456	823	782
Total commodity PSE	Percent	-42	-113	-88	-6	18	-11	-7	1

Z$ = Zimbabwean dollar.
PSE = Producer subsidy equivalent.

Results by Commodity

Corn was the dominant commodity among the four analyzed in this study, accounting for over half the value to producers in most years. Taxation declined from an average of 97 percent of the producer value early in the period to become a subsidy of 15 percent at the end (fig. 1) (table 2). Despite the government policy of supporting communal producers with high prices, the overvalued exchange rate resulted in taxation. This policy led to burdensome stocks after the record 1985 harvest, which caused the GMB to hold nominal prices constant for 3 years. Price increases began again in 1988 after stocks were drawn down to more normal levels.

Wheat producer prices were closely aligned with world prices through 1986. Even though producer prices were high in Zimbabwe, the transportation costs of importing wheat brought border prices close to the domestic price. A sharp increase in the producer price and in the marketing board operating cost gave significant subsidies to producers in 1987. Higher world prices reduced these subsidies in 1988 and 1989. The overvalued Zimbabwean dollar taxed producers in all years, thus offsetting some of the subsidy. Overall, the effect of government intervention on wheat producers shifted from taxes in the early 1980's to small subsidies at the end of the period.

Zimbabwe's cotton producers were taxed most years between 1982 and 1989. However, on average, the rate of taxation declined during the decade. The variation in the

Figure 1

Zimbabwe: Corn producer subsidy equivalent

Percent

direction of the subsidy reflected the Government's price stabilization role. The policy was meant to give consistent price signals to producers despite fluctuations in international prices. The failure to increase the producer price to export parity was due in part to the policy of subsidizing the domestic textile industry.

Results by Policy

Devaluation was the most important factor in lowering producer taxes. Producer prices are still set by the Government through the marketing boards and reflect price stabilization policies. Producer prices for most crops have increased at less than the rate of inflation. Losses by the boards due to expanding services in communal areas have forced managers to hold the line on prices to control costs.

Domestic price controls and foreign exchange policies have the greatest effect on producers. The government role in input supply is negligible. Credit rationing policies could not be quantified for this study. In the early 1980's, foreign exchange policies were more important than domestic controls, but this importance diminished following major devaluations of the Zimbabwean dollar in the mid-1980's.

By the end of the 1980's, producer taxes had changed to subsidies because of price policies. These policies had their greatest effect on corn and cotton producers. Most of the variation in transfers, however, can be attributed to production instability. Rainfed crops, such as corn and cotton, are highly susceptible to drought, a common occurrence in Zimbabwe.
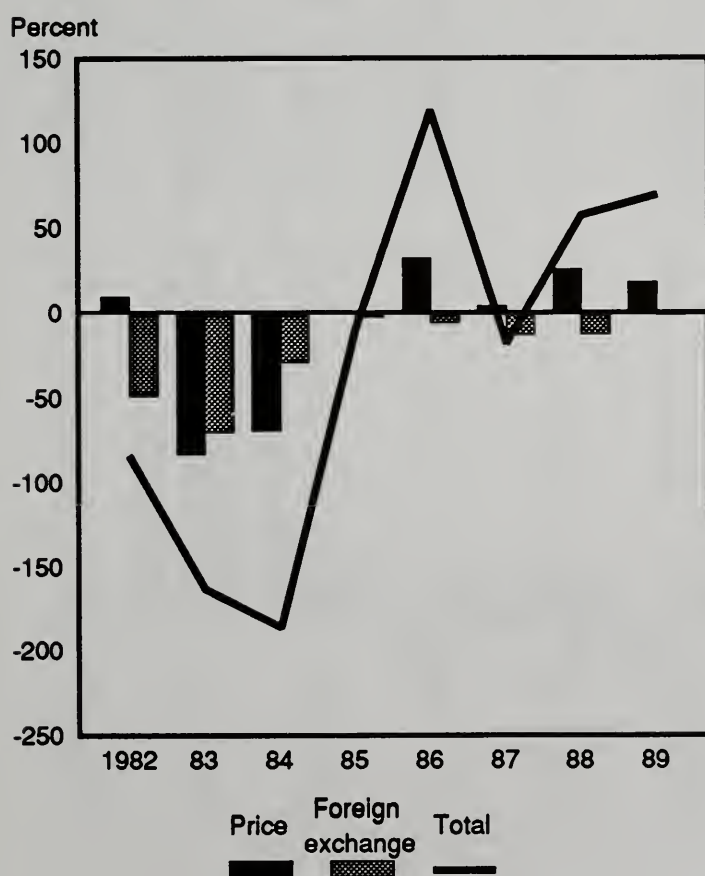
Results for Consumers

Consumer subsidies were markedly reduced as the Government moved to bring prices in line with costs. The average consumer subsidy rate fell from 73 percent in the first 3 years to 11 percent in the last 3 years of the period of this study (table 3). Most of the adjustment resulted from the devaluation of the Zimbabwean dollar.

On a per unit basis, subsidies declined for the food crops, but for cotton, the subsidies remained and averaged 76 percent of consumer cost (table 4). Corn had the highest average subsidy of the food crops, at 46 percent, followed by sorghum at 42 percent and wheat at only 25 percent. Sorghum is used in the processing industry and is not directly subsidized at the retail level. The Government liberalized the market for red sorghum (used for brewing) in 1990. However, the price for white sorghum, which is mixed with wheat and consumed by the lower income groups, is administered by the Government.

The results indicate that the effect of reduced consumer subsidies will be stronger among the urban poor than among rural consumers because most marketed grains are sold in urban areas. It is estimated that in a normal year about 10-15 percent of marketed corn is sold in the rural areas. In drought years, however, market dependency can increase by 50 percent. The Government is evaluating different policy options, such as targeted consumer subsidies, to reduce the short-term effect of price policy adjustments. In the long run, the chal-

lenge is to improve the productivity of the small farms and to provide employment opportunities that will increase the purchasing power of the poor.

Results by Commodity

Consumer subsidies were the mainstay of government policy in the years following independence. However, by the middle of the decade, rising budget deficits forced a reduction in these supports (fig. 2). The most important commodity is corn, the staple food. Since the Government controls, through the GMB, both the buying and the selling price of corn, the board incurs losses as it implements government policies. Increases in the wholesale price of corn frequently lag behind the increases in producer prices. Also, millers are not allowed to immediately pass the wholesale price rises on to consumers.

Wheat imports supply about one-fourth of consumption. Zimbabwe imports almost all of its wheat on concessional terms. To save foreign exchange, the Government negotiates barter arrangements with donor countries to exchange white corn for wheat. The corn is then used in food aid in neighboring countries. The Government has sharply reduced wheat subsidies since 1982. Because of the limited area suitable for wheat production and the high production costs, Zimbabwe cannot continue to expand output of wheat. Consumer wheat prices have been allowed to rise to dampen demand and to slow the growth in imports. With smaller

Table 2—Zimbabwe: Producer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of production	1,000 tons	213	124	99	206	248	215	257	284
Producer price	Z$/ton	190	220	250	285	300	330	365	400
Value to producers	Mil. Z$	40	27	25	59	74	71	94	114
Policy transfers to producers--									
Price subsidy	Mil. Z$	7	0	-2	5	0	21	13	5
Foreign exchange	Mil. Z$	-18	-11	-4	-1	-4	-7	-12	-1
Total policy transfers	Mil. Z$	-11	-10	-6	4	-5	14	1	3
PSE (per unit value)	Percent	-27	-38	-24	7	-6	20	1	3
PSE (per unit quantity)	Z$/ton	-51	-84	-60	19	-19	67	4	11
	US$/ton	-67	-83	-49	12	-12	40	2	5
Corn:									
Level of production	1,000 tons	1,786	884	1,348	2,960	2,546	1,093	2,229	1,931
Producer price	Z$/ton	120	120	140	180	180	180	195	215
Value to producers	Mil. Z$	214	106	189	533	458	197	435	415
Policy transfers to producers--									
Price subsidy	Mil. Z$	20	-88	-131	5	146	7	111	74
Foreign exchange	Mil. Z$	-105	-74	-55	-13	-27	-25	-54	-5
Total policy transfers	Mil. Z$	-84	-163	-186	-9	119	-18	57	69
PSE (per unit value)	Percent	-39	-154	-98	-2	26	-9	13	17
PSE (per unit quantity)	Z$/ton	-47	-184	-138	-3	47	-16	25	36
	US$/ton	-62	-182	-111	-2	28	-10	14	17
Sorghum:									
Level of production	1,000 tons	67	52	56	133	131	53	176	81
Producer price	Z$/ton	115	120	140	180	180	180	195	215
Value to producers	Mil. Z$	8	6	8	24	24	10	34	17
Policy transfers to producers--									
Price subsidy	Mil. Z$	0	-4	-4	-3	3	2	4	-3
Foreign exchange	Mil. Z$	-4	-4	-2	-1	-2	-1	-5	0
Total policy transfers	Mil. Z$	-5	-8	-6	-4	2	1	-2	-3
PSE (per unit value)	Percent	-64	-130	-78	-16	7	14	-5	-19
PSE (per unit quantity)	Z$/ton	-73	-155	-110	-29	12	25	-10	-40
	US$/ton	-96	-154	-88	-18	7	15	-6	-19
Cotton lint:									
Level of production	1,000 tons	56	60	92	105	89	87	117	94
Producer price	Z$/ton	1,390	1,390	1,543	1,821	2,007	2,057	2,224	2,502
Value to producers	Mil. Z$	78	83	141	190	179	179	261	236
Policy transfers to producers--									
Price subsidy	Mil. Z$	6	-20	-78	-33	26	-20	-65	-58
Foreign exchange	Mil. Z$	-48	-51	-42	-5	-13	-29	-45	-4
Total policy transfers	Mil. Z$	-42	-72	-120	-39	14	-49	-110	-62
PSE (per unit value)	Percent	-54	-86	-85	-20	8	-27	-42	-26
PSE (per unit quantity)	Z$/ton	-753	-1,194	-1,313	-372	155	-564	-935	-660
	US$/ton	-991	-1,183	-1,059	-231	93	-340	-520	-313

Z$ = Zimbabwean dollar.
PSE = Producer subsidy equivalent.
US$ = U.S. dollar.

Table 3—Zimbabwe: Summary of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Policy transfers by policy:									
Price subsidy	Mil. Z$	13	152	169	67	-22	32	8	26
Foreign exchange	Mil. Z$	121	158	77	11	26	59	75	8
Policy transfers by commodity:									
Wheat	Mil. Z$	24	22	12	-3	10	-6	14	16
Corn	Mil. Z$	89	260	196	61	-18	62	10	-44
Sorghum	Mil. Z$	8	11	6	4	2	0	5	1
Cotton	Mil. Z$	13	16	32	16	10	34	53	61
CSE by commodity:									
Wheat	Percent	60	41	19	-4	11	-6	11	9
Corn	Percent	44	113	82	16	-5	17	2	-9
Sorghum	Percent	98	121	75	21	10	1	11	1
Cotton	Percent	93	110	88	40	22	71	106	81
Total policy transfers	Mil. Z$	133	309	246	78	3	91	82	34
Cost to consumers	Mil. Z$	262	308	346	511	492	546	672	762
Total commodity CSE	Percent	51	100	71	15	1	17	12	4

Z$ = Zimbabwean dollar.
CSE = Consumer subsidy equivalent.

corn surpluses likely in the future, Zimbabwe cannot rely on triangular transactions to finance its wheat imports.

The CMB has provided large subsidies to textile manufacturers to support the government policy of promoting domestic

Figure 2

Zimbabwe: Corn consumer subsidy equivalent

Percent

Price | Foreign exchange | Total

textile production. The price of cotton lint to the mills was held constant from 1984 to 1988, causing the Board to lose Z$22 million on domestic sales in 1988 (Z$ = Zimbabwean dollar). Beginning in 1989, the domestic price of cotton was allowed to rise and reached the export parity price by 1992. Domestic use of lint is about 30,000 tons a year.
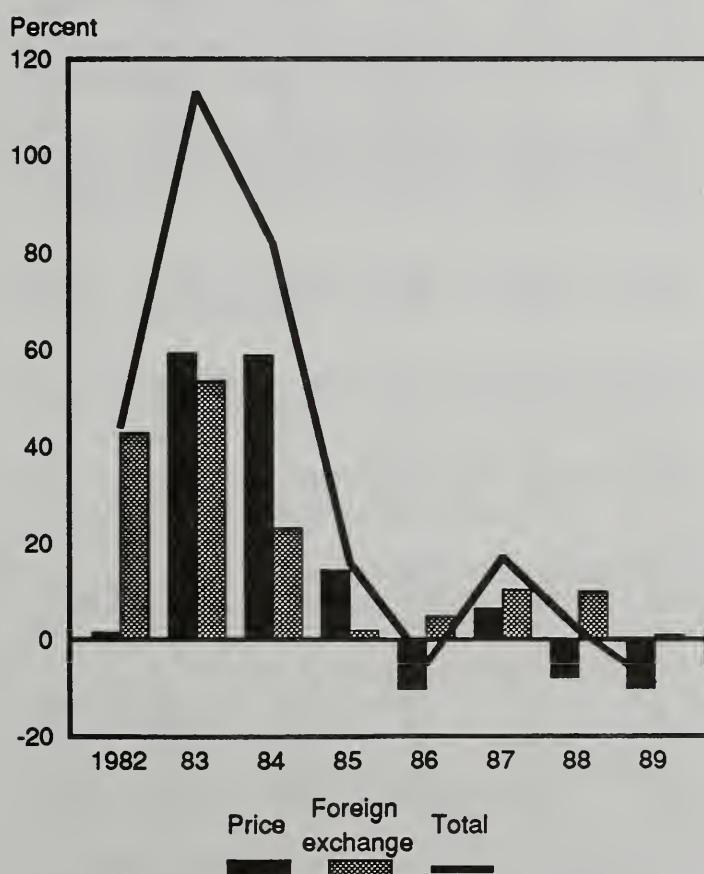
Results by Policy

The major form of government intervention in Zimbabwe is through the exchange rate policy. The overvalued currency subsidized consumers throughout the 1980's. Devaluations at the end of the decade brought the Zimbabwean dollar closer to the equilibrium rate and reduced consumer subsidies for all commodities. Consumer prices were also subsidized in every year except 1986. Again, the goal of the intervention was stabilizing consumer prices. Thus, the actual subsidy rose when world prices were high and declined when world prices fell.

Conclusions

Zimbabwe's highly regulated marketing network is the legacy of the colonial era and, in part, reflects needs that arose during the sanctions period. This system was retained by the postindependence Government for ideological reasons and because it proved to be an expedient system for extending marketing services to rural constituents. The desire to correct past inequities in the provision of services led to the expansion in the marketing infrastructure and in the range of crops that were controlled. While the expansion of the marketing system has been successful in bringing small-holders into the formal marketing system, it has not ensured that rural food-deficit households have adequate access to food.

Agricultural pricing in Zimbabwe is highly interventionist, with the producer and consumer prices for most major prod-

ucts being administratively determined. At the heart of price policies is the central role played by the price of corn, important because of its share in consumer expenditure patterns and because of the high proportion of land and other resources dedicated to corn production.

The financial cost of operating an expanded marketing system has proved to be quite high. The portion of the marketing board deficits that is directly related to expansion of the marketing network is difficult to identify precisely, but that the expansion of the system has contributed significantly to rising costs has now become clear.

The critical issue facing policymakers is how to design and implement a modified agricultural marketing system that en-

sures food availability and maximizes agricultural potential while reducing the costs of operating the system. Relaxing costly and counterproductive government intervention in crop marketing and identifying appropriate roles for the public and private sectors are critical to improving the system.

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Table 4–Zimbabwe: Consumer subsidy equivalents by commodity

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
Wheat:									
Level of consumption	1,000 tons	234	227	220	242	251	271	288	343
Wholesale price	Z$/ton	169	239	285	324	358	378	426	480
Cost to consumers	Mil. Z$	40	54	63	78	90	102	122	165
Policy transfers to consumers--									
Price subsidy	Mil. Z$	4	2	3	-5	5	-14	1	14
Foreign exchange	Mil. Z$	20	20	9	2	5	8	13	2
Total policy transfers	Mil. Z$	24	22	12	-3	10	-6	14	16
CSE (per unit value)	Percent	60	41	19	-4	11	-6	11	9
CSE (per unit quantity)	Z$/ton	101	97	54	-14	38	-21	49	46
	US$/ton	133	97	44	-9	23	-13	27	22
Corn:									
Level of consumption	1,000 tons	1,460	1,467	1,355	1,688	1,526	1,656	1,840	1,706
Wholesale price	Z$/ton	137	157	177	222	222	222	245	285
Cost to consumers	Mil. Z$	200	230	240	375	339	368	451	486
Policy transfers to consumers--									
Price subsidy	Mil. Z$	3	137	141	53	-34	24	-35	-48
Foreign exchange	Mil. Z$	86	124	55	7	16	38	44	4
Total policy transfers	Mil. Z$	89	260	196	61	-18	62	10	-44
CSE (per unit value)	Percent	44	113	82	16	-5	17	2	-9
CSE (per unit quantity)	Z$/ton	61	177	145	36	-12	38	5	-26
	US$/ton	80	176	117	22	-7	23	3	-12
Sorghum:									
Level of consumption	1,000 tons	71	66	49	75	83	118	170	98
Wholesale price	Z$/ton	110	139	165	239	239	239	282	360
Cost to consumers	Mil. Z$	8	9	8	18	20	28	48	35
Policy transfers to consumers--									
Price subsidy	Mil. Z$	3	6	4	3	1	-2	0	0
Foreign exchange	Mil. Z$	5	5	2	0	1	2	5	0
Total policy transfers	Mil. Z$	8	11	6	4	2	0	5	1
CSE (per unit value)	Percent	98	121	75	21	10	1	11	1
CSE (per unit quantity)	Z$/ton	108	168	123	50	25	2	30	5
	US$/ton	142	167	99	31	15	1	17	2
Cotton lint:									
Level of consumption	1,000 tons	12	11	22	24	27	29	31	40
Wholesale price	Z$/ton	1,180	1,310	1,596	1,668	1,647	1,639	1,639	1,884
Cost to consumers	Mil. Z$	14	14	36	40	44	48	50	76
Policy transfers to consumers--									
Price subsidy	Mil. Z$	3	6	21	15	6	24	42	60
Foreign exchange	Mil. Z$	10	9	10	1	4	10	12	2
Total policy transfers	Mil. Z$	13	16	32	16	10	34	53	61
CSE (per unit value)	Percent	93	110	88	40	22	71	106	81
CSE (per unit quantity)	Z$/ton	1,093	1,437	1,405	671	370	1,169	1,733	1,518
	US$/ton	1,439	1,423	1,133	417	222	704	963	720

Z$ = Zimbabwean dollar.

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Appendix: Methodology

Pricing Policy

For PSE's, domestic producer prices, including marketing board operating costs, were compared with international prices, including transportation costs, for wheat, corn, sorghum, and cotton lint (*19*). For CSE's, the wholesale sale price was compared with the international price. Reference prices in U.S. dollars were converted to local currency at the official exchange rate. Overland freight rates were reported in Zimbabwean dollars or South African rand. Rand were converted to Zimbabwean dollars at the official rate.

The reference (international) price for wheat was based on the U.S. gulf ports price. Ocean freight rate for wheat to East African ports was added to bring the commodity to South African ports (*1*). The cost of land transportation was calculated as the difference between the price at South Africa's port and the price of wheat delivered to Zimbabwe (*18*). The average price adjusted by the Consumer Price Index (CPI) was used to estimate years for which data were missing.

For corn, the world price as quoted by the South African Maize Board was used (*10*). This price takes into account the price differential for white corn, which is exported by South Africa and Zimbabwe. Maize Board "costs to ship" were used to bring the price to Zimbabwe's border (*11*).

The international price for U.S. No. 2 yellow sorghum was observed at gulf ports (*4*). The ocean and land transportation costs for wheat were applied to sorghum.

Producer prices for seed cotton were converted to lint by calculating the amount of seed cotton required to produce a ton of lint, based on the ginning rates. The border price was based on export unit values (*18*).

Exchange Rate Policy

The Government's exchange rate policy has been heavily criticized. Although the Zimbabwean dollar is periodically adjusted, it does not float freely, and the Government maintains control over the adjustment rate. In this study, the official rate was adjusted by the index of real effective exchange rate to measure the exchange rate distortion factor (*3*). The adjusted exchange rate is the official rate in 1990, assuming the 1990 rate is undistorted, divided by the index of the real effective exchange rate. The difference between the adjusted and the official rate represents the distortion due to the exchange rate policy. This difference was multiplied by the volume of production (or consumption) and by the product price to determine exchange rate transfers.

Appendix table 1--Wheat: Calculation of Zimbabwe's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	37	23	20	42	46	37	47	50
B. Production	1,000 tons	213	124	99	206	248	215	257	284
C. Producer price	Z$/ton	190	220	250	285	300	330	365	400
D. Producer value (B*C)/1,000	Mil. Z$	40	27	25	59	74	71	94	114
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including GMB operating costs	Z$/ton	219	253	279	329	377	424	478	537
b. Border price, South African port	US$/ton	186	190	187	174	145	139	198	200
c. Border price, South African port	Z$/ton	141	192	232	280	242	231	356	422
d. Border price, Zimbabwe	Z$/ton	184	249	297	303	378	326	429	520
e. Price support (1a-1d)*B/1,000	Mil. Z$	7	0	-2	5	0	21	13	5
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price, equilibrium exchange rate	Z$/ton	270	336	339	310	396	357	474	526
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	-18	-11	-4	-1	-4	-7	-12	-1
F. Total transfers to producers:									
1. Total (1e+2d)	Mil. Z$	-11	-10	-6	4	-5	14	1	3
2. Producer subsidy equivalents (F1/D)*100	Percent	-27	-38	-24	7	-6	20	1	3
G. Consumption	1,000 tons	234	227	220	242	251	271	288	343
H. Wholesale price	Z$/ton	169	239	285	324	358	378	426	480
I. Consumer cost (G*H)/1,000	Mil. Z$	40	54	63	78	90	102	122	165
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, Zimbabwe	Z$/ton	184	249	297	303	378	326	429	520
b. Wholesale price	Z$/ton	169	239	285	324	358	378	426	480
c. Price support (1a-1b)*G/1,000	Mil. Z$	4	2	3	-5	5	-14	1	14
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price, equilibrium exchange rate	Z$/ton	270	336	339	310	396	357	474	526
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	20	20	9	2	5	8	13	2
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Z$	24	22	12	-3	10	-6	14	16
2. Consumer subsidy equivalents (K1/I)*100	Percent	60	41	19	-4	11	-6	11	9

ha. = Hectare.
Z$ = Zimbabwean dollar.
GMB = Grain marketing board.
US$ = U.S. dollar.

Appendix table 2--Corn: Calculation of Zimbabwe's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	1,407	1,322	1,356	1,429	1,314	1,211	1,236	1,198
B. Production	1,000 tons	1,786	884	1,348	2,960	2,546	1,093	2,229	1,931
C. Producer price	Z$/ton	120	120	140	180	180	180	195	215
D. Producer value (B*C)/1,000	Mil. Z$	214	106	189	533	458	197	435	415
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including operating costs	GMBZ$/ton	151	150	184	255	257	243	276	295
b. Border price, South African port	US$/ton	127	184	180	121	85	104	105	96
c. Border price, South African port	Z$/ton	97	186	223	195	141	172	189	203
d. Border price, Zimbabwe	Z$/ton	139	250	281	254	199	237	226	257
e. Price support (1a-1d)*B/1,000	Mil. Z$	20	-88	-131	5	146	7	111	74
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price, equilibrium exchange rate	Z$/ton	198	334	322	258	210	260	250	259
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	-105	-74	-55	-13	-27	-25	-54	-5
F. Total transfers to producers:									
1. Total (1e+2d)	Mil. Z$	-84	-163	-186	-9	119	-18	57	69
2. Producer subsidy equivalents (F1/D)*100	Percent	-39	-154	-98	-2	26	-9	13	17
G. Consumption	1,000 tons	1,460	1,467	1,355	1,688	1,526	1,656	1,840	1,706
H. Wholesale price	Z$/ton	137	157	177	222	222	222	245	285
I. Consumer cost (G*H)/1,000	Mil. Z$	200	230	240	375	339	368	451	486
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, Zimbabwe	Z$/ton	139	250	281	254	199	237	226	257
b. Wholesale price	Z$/ton	137	157	177	222	222	222	245	285
c. Price support (1a-1b)*G/1,000	Mil. Z$	3	137	141	53	-34	24	-35	-48
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price, equilibrium exchange rate	Z$/ton	198	334	322	258	210	260	250	259
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	86	124	55	7	16	38	44	4
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Z$	89	260	196	61	-18	62	10	-44
2. Consumer subsidy equivalents (K1/I)*100	Percent	44	113	82	16	-5	17	2	-9

ha. - Hectare.
Z$ - Zimbabwean dollar.
GMB - Grain marketing board.
US$ - U.S. dollar.

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Appendix table 3—Sorghum: Calculation of Zimbabwe's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1.000 ha.	208	288	166	226	172	180	220	148
B. Production	1.000 tons	67	52	56	133	131	53	176	81
C. Producer price. white	Z$/ton	115	120	140	180	180	180	195	215
D. Producer value (B*C)/1.000	Mil. Z$	8	6	8	24	24	10	34	17
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including operating costs	GMBZ$/ton	145	152	178	261	276	266	302	325
b. Border price. South African port	US$/ton	144	165	156	140	114	94	135	146
c. Border price. South African port	Z$/ton	109	167	194	225	191	156	244	307
d. Border price. Zimbabwe	Z$/ton	152	232	253	284	249	220	281	361
e. Price support (1a-1d)*B/1.000	Mil. Z$	0	-4	-4	-3	3	2	4	-3
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price. equilibrium exchange rate	Z$/ton	218	307	288	289	264	241	312	365
d. Exchange rate subsidy (1d-2c)*B/1.000	Mil. Z$	-4	-4	-2	-1	-2	-1	-5	0
F. Total transfers to producers:									
1. Total (1e+2d)	Mil. Z$	-5	-8	-6	-4	2	1	-2	-3
2. Producer subsidy equivalents (F1/D)*100	Percent	-64	-130	-78	-16	7	14	-5	-19
G. Consumption	1.000 tons	71	66	49	75	83	118	170	98
H. Wholesale price	Z$/ton	110	139	165	239	239	239	282	360
I. Consumer cost (G*H)/1,000	Mil. Z$	8	9	8	18	20	28	48	35
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price. Zimbabwe	Z$/ton	152	232	253	284	249	220	281	361
b. Wholesale price	Z$/ton	110	139	165	239	239	239	282	360
c. Price support (1a-1b)*G/1.000	Mil. Z$	3	6	4	3	1	-2	0	0
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Border price. equilibrium exchange rate	Z$/ton	218	307	288	289	264	241	312	365
d. Exchange rate subsidy (1d-2c)*B/1.000	Mil. Z$	5	5	2	0	1	2	5	0
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Z$	8	11	6	4	2	0	5	1
2. Consumer subsidy equivalents (K1/I)*100	Percent	98	121	75	21	10	1	11	1

ha. — Hectare.
Z$ — Zimbabwean dollar.
GMB — Grain marketing board.
US$ — U.S. dollar.

Appendix table 4--Cotton lint: Calculation of Zimbabwe's producer and consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987	1988	1989
A. Area harvested	1,000 ha.	138	191	230	193	243	273	248	228
B. Production	1,000 tons	56	60	92	105	89	87	117	94
C. Producer price 1/	Z$/ton	1,390	1,390	1,543	1,821	2,007	2,057	2,224	2,502
D. Producer value (B*C)/1,000	Mil. Z$	78	83	141	190	179	179	261	236
E. Policy transfers to producers:									
1. Price wedge--									
a. Producer price including operating costs	GMBZ$/ton	1,520	1,553	1,688	1,967	2,172	2,243	2,437	2,743
b. Border price, export unit value	Z$/ton	1,415	1,890	2,537	2,287	1,877	2,477	2,990	3,361
c. Price support (1a-1b)*B/1,000	Mil. Z$	6	-20	-78	-33	26	-20	-65	-58
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.22	1.47	1.47	1.65	1.79	1.88	2.03	2.14
c. Percent overvaluation	Percent	61	45	18	2	7	13	13	1
c. Border price, equilibrium exchange rate	Z$/ton	2,273	2,747	3,001	2,339	2,017	2,808	3,372	3,402
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	-48	-51	-42	-5	-13	-29	-45	-4
F. Total transfers to producers:									
1. Total (1e+2d)	Mil. Z$	-42	-72	-120	-39	14	-49	-110	-62
2. Producer subsidy equivalents (F1/D)*100	Percent	-54	-86	-85	-20	8	-27	-42	-26
G. Consumption	1,000 tons	12	11	22	24	27	29	31	40
H. Wholesale price	Z$/ton	1,180	1,310	1,596	1,668	1,647	1,639	1,639	1,884
I. Consumer cost (G*H)/1,000	Mil. Z$	14	14	36	40	44	48	50	76
J. Policy transfers to consumers:									
1. Price wedge--									
a. Border price, export unit value	Z$/ton	1,415	1,890	2,537	2,287	1,877	2,477	2,990	3,361
b. Wholesale price	Z$/ton	1,180	1,310	1,596	1,668	1,647	1,639	1,639	1,884
c. Price support (1a-1b)*G/1,000	Mil. Z$	3	6	21	15	6	24	42	60
2. Exchange rate adjustment--									
a. Official exchange rate	Z$/US$	0.76	1.01	1.24	1.61	1.67	1.66	1.80	2.11
b. Equilibrium exchange rate	Z$/US$	1.15	1.31	1.31	1.47	1.68	1.81	1.90	2.11
c. Border price, equilibrium exchange rate	Z$/ton	2,273	2,747	3,001	2,339	2,017	2,808	3,372	3,402
d. Exchange rate subsidy (1d-2c)*B/1,000	Mil. Z$	10	9	10	1	4	10	12	2
K. Total transfers to consumers:									
1. Total (1c+2d)	Mil. Z$	13	16	32	16	10	34	53	61
2. Consumer subsidy equivalents (K1/I)*100	Percent	93	110	88	40	22	71	106	81

ha. = Hectare.
Z$ = Zimbabwean dollar.
GMB = Grain marketing board.
US$ = U.S. dollar.
1/ Producer price of seed cotton multiplied by 2.78.